

## Bi-State Domestic Freight Ferries Study

*A joint effort with the Alan M. Voorhees Transportation Center*

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## **EXECUTIVE SUMMARY**

This study, funded by the Port Authority of New York & New Jersey, explores the feasibility of freight ferries as an alternative for domestic truck freight movements that cross the Hudson River via existing bridges and tunnels. While “mode shift” efforts, such as direct rail or barging of material, can reduce some truck movements, trucking will remain a dominant component of the region’s freight system and traffic. At the same time, congestion is growing on the region’s roadway system, making the evaluation of alternatives for truck movements more imperative.

The study differs from previous efforts in several important respects. The scope of this study is tightly focused on intra-harbor ferries that would carry domestic freight that would otherwise be transported by truck over the roadway network. In addition, this study concentrates on the key factors that have spurred freight ferry markets and use in other locations, rather than trying to identify specific routes or locations.

Based on the team’s analysis, three central conclusions emerged:

1. Regulation or prohibition of certain truck movements for safety, security or environmental reasons will likely be needed as a precondition to create and shape requisite markets for future freight ferry services in this region.
2. Experience elsewhere suggests that niche market development, as opposed to approaches that would serve broad commercial traffic, are not only viable starting points, but are likely the best way to ensure local success of freight ferry systems.
3. Increased security, new emergency services alternatives, and increased service efficiency are potential regional benefits that may be derived from freight ferry system development.

### **Public Policy Intervention Will Be Needed to Create and Shape the Freight Ferry Market**

Based on the research and available examples, it appears that a freight ferry would not provide the time and/or cost savings necessary to attract general freight movement given current, “tolerable” levels of congestion and shippers’ preference for single line (all highway) service. Thus, without public policy intervention and leadership it is unlikely that a ferry market for trucks will readily develop on its own. Further, development of public policy to promote freight ferry operations in this region would prove complex because of the multiple public agencies, communities and private interests that have a stake in their development.

With such public leadership, based on clear and practicable policies, a successful bi-state freight ferry operation could be implemented as has been done in at least two other cases: Detroit-Windsor and Quincy-Deer Island. In the former, a publicly-owned, privately-operated tunnel and a privately-owned and operated bridge both made formal corporate decisions to refuse to allow transport of a particular set of goods (hazardous material or Hazmat), thus providing the service needs around which the Detroit-Windsor Truck Ferry built its initial operations. The Ferry has since attracted over-weight and over-dimensional vehicles as well as some general truck traffic to its service mix. In the latter case, a public authority in conjunction with the local town, made the decision that all materials and personnel needed to build the Deer Island sewage treatment facility would be barged rather than driven on local streets into the construction site.

### **Niche Markets Are the Best Means for Ensuring Success**

The freight ferry research team identified and assessed four potential niche markets in the NY metropolitan region:

1. Hazardous materials
2. Over-weight and over-dimensional vehicles
3. Construction materials and equipment
4. Air cargo movements to/from JFK

The team's review of these four markets indicates that the first three niches provide potentially viable opportunities for bi-state freight ferry operations. Detroit-Windsor Ferry operations suggest that the movement of hazardous materials and over-weight/over-dimensional vehicles could be pursued in tandem as potential markets, even though the policy and administrative decisions required to foster them are somewhat different. Ferry movement of construction materials/equipment comprises a third market that could serve both the public interest and private goals. Construction-based ferry service offers the opportunity to remove potentially significant numbers of truck movements from congested areas, such as built up sections of Manhattan. It allows staging areas, and off-site assembly could lower overall construction costs and mitigate negative environmental roadway and street use impacts (such as those flowing from construction and debris removal from surrounding communities).

### **Increased Security Could Be an Added Benefit**

A freight ferry could enhance emergency and security operations in several key ways. Regardless of which niche market is being serviced, a ferry provides increased redundancy for the overall regional transportation network. It is less susceptible to sabotage since it requires less fixed infrastructure. It also offers more flexibility in times of crisis since freight to passenger use, routes and landing sites can be changed with relative ease (e.g., a freight ferry could easily switch to moving people, other types of vehicles, and even military equipment, if necessary).

For specific niche markets, a freight ferry would offer additional security benefits. By concentrating all Hazmat on ferries, agencies could gain tighter control of these shipments throughout the region. In the cases of OW/OD vehicles and vehicles transporting Hazmat, enforcement (especially spot checks) could be made simpler and more effective because all such vehicles would be utilizing the same crossing. Nevertheless, new service site selection and system service routes would be of concern for the communities affected and could create new liability issues for the agencies that would change current practices (to foster the creation of freight ferry operations) and for the new ferry operators.

### **Moving Forward with Freight Ferries**

Based on the cases and the research into freight ferries more broadly, the team identified several components of successful freight ferries as well as several steps needed to pursue successful operations in this region.

First, leadership is important, particularly in a region with multiple jurisdictional authorities. In this regard the Port Authority of New York & New Jersey is uniquely placed to provide such leadership where bi-state service is involved. However, there are several other entities with whom the PA or any other lead agency would need to coordinate with to develop and implement requisite policies and rules. Among others, they would include the Metropolitan Transportation Authority (MTA), Lower Manhattan Development Corporation, NJ Transit, New York City Department of Transportation, New York and New Jersey State Departments of Transportation, and (in the case of Hazmat) the City of New York Fire Department as well as generally local governments and community groups on both sides of the Hudson.

Second, this report identifies potential bi-state markets based on what has worked elsewhere and what might work in this region. However, more technically specific analyses would be needed for each of the potential niche markets identified. It is possible that this next phase could be bolstered by a public request for proposals process that would outline work needed to be performed by private firms seeking to provide new freight ferry operations.

Third, having an experienced operator familiar with maritime operations and associated costs is essential. Due diligence will be needed to refine the parameters, costs and aspects of each niche market service, and ensure that all regulations are taken into account during decision making.

Finally, the team identified a series of federal considerations, ranging from the applicability of the Harbor Maintenance Tax (HMT) to crewing requirements that need to be formally addressed prior to the commencement of any service. These rules and regulations can potentially adversely affect operating costs. Among the issues are the following:

- HMT: Though the HMT is not an issue in the Harbor, because the wording of the regulation is open to interpretation, this will need to be formally clarified as actual routes and landing/staging areas are identified.
- Jones Act: While there are likely vessels already built that could be used, thus reducing the Jones Act's impact on initial capital costs, other regulations regarding the percentage of the crew who are citizens versus those with working permits will need to be taken into account.
- Crewing: The number of crewmembers needed will have to be estimated since there are few freight ferries in the United States and there are no specific guidelines as yet.

In cases where rules and regulations are unclear in their applicability, it would be important to reach formal determinations and agreements with the appropriate federal agencies prior to implementing ferry service.

Freight ferries have been proven to work in certain situations and markets. These potential benefits could accrue to this region. However, without effective leadership, coordination on key policy decisions and sufficient enforcement by agencies in New York and New Jersey, moving the freight ferry options forward would likely prove difficult, if not impossible.

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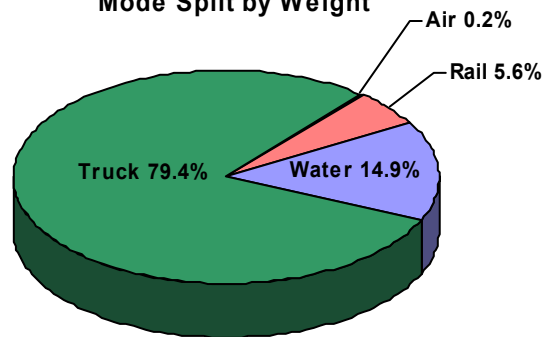
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# 1. INTRODUCTION

In 2000, over 580 million tons of freight, valued at \$1.44 trillion, moved to, from or through the New York metropolitan region.<sup>1</sup> Though the region is a net consumer of goods, importing 236.4 million tons of goods and exporting almost 180.9 tons in 2000, roughly 28% of the tonnage and 22% of the value of goods flowed between and among counties within the region.<sup>2</sup> As a result of changing business patterns and increased economic activity within and beyond the region, forecasts predict an increase of approximately 70% in freight flows throughout the New York metropolitan region by 2025.<sup>3</sup>

With respect to modal split, freight movements throughout the region are dominated by trucking (Figure 1). This reliance on trucks for freight flows is an ongoing concern given the region's already congested highway system. While "mode shift" efforts, such as direct rail or barging of material, can reduce some truck movements, trucking will remain an important component of the region's freight system and traffic.

**Figure 1. New York Metropolitan Area Mode Split by Weight**



Source: NYCEDC, *Cross Harbor Freight Movement Project - Draft Environmental Impact Statement, Appendix 2B, p. 10.*

In some locations and at certain times, on the Cross Bronx Expressway during the midday period for example, commercial vehicles account for as much as 36% of traffic and tractor-trailers account for up to 19% of traffic.<sup>4</sup> This is only expected to worsen if alternatives are not found or different operational tactics implemented.

Current estimates forecast a 50% increase in the congestion levels by 2020.<sup>5</sup> The overwhelming dependence on trucks and lack of an easy means to add roadway capacity makes it important to seek new options to facilitate truck movements within the region while reducing vehicle miles traveled (VMTs). Alternatives to the existing network of tunnels, bridges and roadways also address security concerns by increasing the flexibility to respond if a segment in the system is temporarily incapacitated and by increasing overall transportation redundancy.

## PURPOSE OF THE STUDY

This study, funded by the Port Authority of New York & New Jersey, explores the feasibility of freight ferries as a potential intra-regional waterborne alternative for truck freight movements across the Hudson River/New York Harbor. As such, this study evaluates potential markets within the region, identifies factors that could aid or impede development of freight ferry operations across the NY/NJ Harbor, develops a framework for how best to proceed, and indicates areas where additional information or policy decisions are needed to develop and implement a sustainable freight ferry operation.

Several recent studies have explored waterborne alternatives for freight movement in the region, notably the New York Metropolitan Transportation Council's (NYMTC) study on Hunts Point, New York City Economic Development Corporation's Cross Harbor Freight Movement Project, New Jersey Department

<sup>1</sup> As defined here, the New York metropolitan region is comprised of the 30-county region including New York City, the 3 counties in Western Connecticut, 7 counties north of New York City in New York, the 2 counties on Long Island, and 13 counties in Northern New Jersey. New York City Economic Development Corporation (NYCEDC), *Cross Harbor Freight Movement Project – Draft Environmental Impact Statement, Appendix 2B: Commodity Flow Analysis*, Produced in cooperation with U.S. Department of Transportation, Federal Highway Administration and Federal Rail Administration (NY: NYCEDC, April 2004), pp. 2 and 6.

<sup>2</sup> *Ibid.*, p. 6.

<sup>3</sup> NYCEDC, *Cross Harbor Freight Movement Project – Draft Environmental Impact Statement*, p. 1-1.

<sup>4</sup> Cambridge Systematics, *NYMTC Regional Freight Plan: Task 2 – Description of Freight Transportation System in the Region*, Final Technical Memorandum, Prepared for NYMTC (July 2001), pp. 2-13.

<sup>5</sup> Edwards and Kelcey Engineers, "Cross Harbor Freight Movement Major Investment Study," prepared for NYCEDC (May 2000), p. ES-1, <http://www.crossharborstudy.com/finalrep.pdf>, Accessed online 04/28/05.

of Transportation's report on market demand for New Jersey ferry services, and TransTech Marine Co.'s "Analysis of Potential Freight Ferry Alternatives to the Proposed Cross Harbor Freight Tunnel."<sup>6</sup> Additionally, there have been a number of studies beyond the New York metropolitan region on coastal short-sea shipping, the most recent released by the National Ports and Waterways Institute (NPWI) at the University of New Orleans.<sup>7</sup>

### What is Different about This Study

The current study draws from these sources at times, but differs from these previous efforts in several important respects. First and foremost, the scope of this study is much narrower. The study team was directed to look specifically at *intra-harbor* freight ferries (as opposed to short sea shipping) that would carry *domestic freight that would otherwise be transported by truck* (in contrast to studies related to the Cross Harbor tunnel which link rail movements). Second, and of particular importance, the current study utilizes a different methodological approach. Instead of focusing solely on data to determine the feasibility of a freight ferry in the New York metropolitan area, this effort focuses on describing what has *actually* spurred freight ferry markets in other North American locations. Thus, it makes use of several case studies as a means for identifying issues and providing illustrations of effective approaches as well as the potential markets for developing a freight ferry. Finally, this report does not seek to identify specific waterborne routes and landside locations, nor does it develop a plan for funding. However, the report contributes to the literature by adding to the base of data, derived from examples of actual operations in other locations, which will be needed to identify the public policy and business planning decisions needed to create specific niche market opportunities.

### DEFINITIONS, GUIDING PRINCIPLES, AND METHODOLOGY

Since there are few examples upon which to draw, the study purposely explored the broadest range of ferry types possible for this study, beginning with a much more expansive definition that included all self-propelled vehicles and tug and barge operations and that looked to the literature on both freight ferries and on short sea shipping.<sup>8</sup> After the discussions in which the study team was requested to specifically look only to those that are intra-harbor and that carry domestic freight that would otherwise be transported by truck, the definition of the kind of freight ferry to be examined was further narrowed.

Thus, for the purpose of this report, freight ferries are defined as *waterborne vessels (either self-propelled or tug and barge) primarily carrying vehicles, and possibly passengers, across a narrow bay or harbor between a set of fixed landings*. For example, a vessel transporting trucks between New Jersey and Manhattan would be considered a freight ferry.

Beyond this definition, there are two distinguishing features of the freight ferries explored for the purposes of this report:

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<sup>6</sup> Since the team was specifically asked to review the Hunts Point study, it should be noted that the information in it was not as relevant to the current report as the other studies identified here, with the exception of some similar findings related to potential limitations on an air cargo niche market (e.g., berth and wake issues). Beyond this, the Hunts Point study dealt with different routes and markets (to/from Hunts Point, food stuffs) and looked to container as well as truck barges. See Cambridge Systematics, Inc., Hunts Point Waterborne Freight Assessment: Opportunities to Meet the Community's Freight Transportation Needs through Waterborne Strategies, Draft Final Report, Prepared for NYMTC (August 18, 2004). For the other reports identified, see NYCEDC, Cross Harbor Freight Movement Project – Draft Environmental Impact Statement; TAMS Consultants, Inc., *Assessment of the Market Demand for New Jersey Ferry Services: Final Report*, Prepared for the New Jersey Department of Transportation (January 2000); and, TransTech Marine, "Analysis of Potential Freight Ferry Alternatives to the Proposed Cross Harbor Freight Tunnel," prepared for North Jersey Transportation Planning Authority, Inc. (September 2004), [http://njtpa.org/planning/freight/documents\\_freight/CH\\_FrFerry\\_AtchB.pdf](http://njtpa.org/planning/freight/documents_freight/CH_FrFerry_AtchB.pdf), Accessed online 6/24/05.

<sup>7</sup> National Ports and Waterways Institute (NPWI), *The Public Benefits of the Short-Sea Intermodal System*, Prepared for the Short Sea Cooperative Program (New Orleans: University of New Orleans, November 2004). Also see NPWI, *High Speed Ferries and Coastwise Vessels: Evaluation of Parameters and Markets for Application*, Prepared for the Center for the Commercial Deployment of Transportation Technologies (New Orleans: Louisiana State University, June 2000).

<sup>8</sup> The Maritime Administration (MARAD) defines short sea shipping as "commercial waterborne transportation that does not transit an ocean. It is an alternative form of commercial transportation that utilizes inland and coastal waterways to move commercial freight from major domestic ports to its destination." See MARAD, "Short Sea Shipping," <http://marad.dot.gov/Programs/sssbroc.htm>, Accessed online 6/28/05.

- The freight ferries are RO/RO operations; and,
- The ferries are either “pure” freight operations or combined freight/passenger operations.

The first characteristic refers to how cargo is loaded: ferries may be lift-on/lift off (LO/LO) or roll on/roll off (RO/RO). On a LO/LO vessel, cargo (generally in the form of containers) is transferred between the dockside and the ferry by the use of cranes, which are located either on the ship or in the port. Almost all of the cargo on a RO/RO vessel is on wheels, primarily in the form of trailers or trailers with tractors. The trailers are rolled on and off the vessel's decks through a special ramp or bridge. The focus on truck movements, combined with initial research findings led the team to further limit the study to RO/RO operations. Thus, the remainder of the report focuses on RO/RO vessel types.

The second distinguishing feature relates to whether the vessels carry only cargo – in other words, “pure” freight ferries – or carry both passengers and trailers or vehicles as is the case with passenger/vehicle ferries. Each has different types of issues related to them, particularly with respect to crewing and several other regulations depending upon what type of cargo is being transported. Both freight only and freight/passenger systems were explored here, though the overarching goal remained the movement of freight.

### **Guiding Principles for the Study**

While exploring the cases and the various issue areas associated with developing a successful and sustainable freight ferry operation crossing the NY/NJ Harbor, the study team was guided by several principles.

1. ***Ferry service could offer more efficiency and flexibility for freight movers.*** For trucks carrying certain exceptional cargoes, moving throughout the New York metropolitan region is requires multiple permitting from multiple agencies. Further, there are time of day and route restrictions that do not always easily match from one jurisdictional authority to the next. A new freight ferry service could make such movements more efficient and flexible for both public and private sectors.
2. ***Freight ferry service could provide increased security, safety, and emergency response capabilities.*** A freight ferry operation across the NY/NJ Harbor would provide some redundancy in transportation; the ferry provides an alternate route in the event that a bridge and/or tunnel could not be used. Ferries can provide more flexibility in routes during emergency situations since they require minimal fixed infrastructure for landing and can modify their routes to a degree. Also, in the case of cargoes that pose a major risk or hazard in transport, moving such materials by ferry can help reduce the danger to key regional fixed infrastructure. Finally, spot inspections for Hazmat could be made much more efficient and effective through a ferry system since all Hazmat would be traveling via a single point rather than multiple bridges and tunnels.
3. ***Freight ferry service could offer a means for reducing community disruption.*** Large construction projects often cause community disruption not just in neighboring communities but in any of those through which the trucks transporting equipment and materials are routed. Community impacts resulting from such movements include congestion, noise, debris, overall wear and tear on the roadways, and often a perception of decreased safety. Ferries offer a means for avoiding, or at least mitigating, such disruptions through greater off-site assembly and less disruptive transport.
4. ***Freight ferry service could aid in congestion mitigation and/or congestion avoidance.*** By providing an alternate means of travel for trucks that would otherwise need to utilize bridges, congestion could be reduced. Initially, this reduction might be relatively small, but in time, if general freight can be attracted to the service, it could prove much greater.
5. ***Freight ferry service should be revenue neutral or have a positive cash flow.*** Ongoing freight ferry service needs to be self supporting to be sustainable. There is an argument to be made that in cases where the negative impacts for communities are so great that a freight ferry

could be deemed a better approach for environmental, security, congestion, or other policy reasons over a finite period of time.

6. ***Freight ferry service could be operated by either the public or private sectors or through joint operations.*** What form the ferry service takes is likely to be dependent in part on what niche market is being served.

### **Methodology and Process**

The first step in the study was to identify as many cases of short sea shipping in the United States as possible. This provided the team with a broad understanding of the status of short sea shipping across the country and allowed the team to look for potential applications for the New York-New Jersey Harbor. Twenty-three short sea shippers were initially identified, ranging from tug-barge coastal shippers in Alaska to the passenger/freight fast ferry between Rochester and Toronto. Despite the exhaustiveness of the initial literature review, the number of cases from which to draw was limited.

After consultation with Port Authority officials, internal discussions among the study team, and discussions with outside consultants, the decision was made to focus on “intra-harbor” or “intra-bay” examples of short sea shipping, as the most relevant application to the New York-New Jersey market. In addition, the team was specifically asked to look at freight ferry alternatives that would divert domestic commercial vehicles from highways to waterborne transport.

Of the 23 initially identified operations, eight were eliminated because they represented coastal operations. Ten more were eliminated because they either provided an alternative primarily to rail or because there was no alternate mode beyond waterborne travel. Of the final five remaining, the intra-harbor Red Hook Barge marine container operation was not examined because it was at lift-on/lift-off (LO/LO) operation, unique to international cargo operations, rather than a roll-on/roll-off (RO/RO) service more applicable for domestic freight service opportunities.

Four cases were mutually chosen that met the criteria established above or provided specific policy or market lessons from which this region could benefit:

- The Detroit Windsor Truck Ferry;
- The Galveston-Port Bolivar Ferry;
- The Quincy-Deer Island Freight Ferry; and,
- The Rochester-Toronto “Breeze.”

Two additional examples that cross Long Island Sound – the Bridgeport-Port Jefferson Ferry and the New London-Orient Point Ferry – were briefly assessed. However, the study team concluded that the former is entirely a passenger/car operation and for the latter, while it does transport trucks, freight is still incidental to its primary business of passenger transport. Further, the team did not feel that either of these cases added anything unique or additional to the knowledge gained from the other four cases.

Table 1 summarizes the characteristics of the four cases this study examined. Through a combination of literature review and interviews, case studies were developed for each of these four examples to discern common themes and lessons learned that would be relevant to successful freight ferry development. Once the initial cases were selected, the study team began identifying potential markets, looking both at the types of markets served by other freight ferry operations and the markets that could be served in the New York metropolitan region, as well as various obstacles. Four markets were identified as potential areas for further study: hazardous materials, over-weight and over-dimensional vehicles, construction materials, and domestic air freight. The team was specifically asked not to look at waste, since other studies are in the process of addressing the feasibility of this market.

Additionally, literature was reviewed and conversations were held with experts on several key issues that could potentially affect freight ferry development, particularly sources of funding, the Harbor Maintenance Tax (HMT) and other user fees, the Jones Act, and crewing issues. Quantitative analysis using market

and commodity data, as well as qualitative analysis, was also performed to examine the relevance of various freight ferry markets to the New York-New Jersey region.

**Table 1: Freight Ferry Projects Examined in This Study**

Route	Operator	Alternative Freight Modes Available	Cargo Handling Type	Freight Only?	Type	Propulsion
Detroit, Michigan-Windsor, Ontario	Detroit-Windsor Truck Ferry	None for HAZMAT within 100 miles	Trucks/Trailers	Yes	RO/RO	Tug-barge
Galveston Island-Port Bolivar	Galveston-Port Bolivar	Highway	Tractor-Trailers, Vehicles	No	RO/RO	Self-propelled
Quincy, MA-Deer Island, MA (1990-2000)	Boston Towing Company	Local Roads through the Town of Winthrop	Tractor-Trailers and Construction Equipment	Yes	RO/RO	Tug-barge with separate roundabout for the truck drivers
Rochester-Toronto	"The Breeze"	Existing infrastructure	Trucks	No	RO/RO	Self-propelled

#### OUTLINE OF THE REPORT

Section 2 assesses potential markets in the New York metropolitan region and other external considerations relevant for establishing ferry operations. Four potential markets are offered and then discussed with respect to the likelihood of each being successfully pursued in this region. Section 3 provides details on the four cases, describing their operations, reasons for being developed, the key obstacles they faced, and why they have succeeded or failed. The section concludes with a summary of lessons learned from analysis of the cases. Section 4 deals with the Harbor Maintenance Tax and other user fees, federal regulations and funding mechanisms, labor and crewing issues, and other potential obstacles or opportunities for developing a successful ferry operation. Finally, Section 5 closes with a set of overall conclusions and recommendations.

## 2. MARKETS

Trucks did not become the dominant freight mode in the United States by chance. Indeed, they displaced railroads, which had already displaced waterborne travel, precisely because they had several key advantages over rail. Trucks were more flexible in when and where they could travel, allowed for more time sensitivity, and were a cheaper mode for short distances and for moving smaller quantities of goods.

Similarly, for any new freight mode to capture a sizeable part of the freight market moving across the Hudson River, it must provide significant benefits for customers – cost and/or time savings – and it must be perceived as reliable. While congestion has become a major problem in the New York metropolitan region, the situation has not yet reached the point that a significant time savings can be achieved by diverting freight to ferry except, potentially, during peak travel periods. Further, the lack of experience with a financially viable freight ferry operation in the New York metropolitan area dampens interest in shipments by water. Such factors present obstacles to a new freight ferry operation serving general freight transport in this region.

Based on the literature reviews and case studies, the team identified a framework for implementing a successful freight ferry operation that helps overcome these obstacles by initially focusing on niche markets. Indeed, as will be seen in Section 3, domestic freight ferries in other locations have already proven successful when serving niche markets. Interestingly, in its assessment of market demand for New Jersey ferry services, TAMS Consulting noted similar findings, suggesting that “the ferry service types can provide a variety of niche links in multi-modal travel corridors to contribute incrementally to corridor mobility” and that “niche services with small catchment areas can play an expanded corridor mobility role when connected with intermodal rail links such as passenger services at Weehawken or Hoboken, or the freight service on the New York Cross Harbor Railroad carfloat.”<sup>9</sup> Similarly, while TAMS was assessing specific routes based on already existing operations, the report still noted that “potential exists for short and long term growth for targeted, niche-serving freight services...”<sup>10</sup>

### POTENTIAL NICHE MARKETS IN THE NEW YORK METROPOLITAN AREA

The team identified four potential niche markets for freight ferry operations in the New York Metropolitan area:

- Air cargo movement to/from John F. Kennedy International Airport (JFK);
- Construction materials and equipment;
- Hazardous materials; and,
- Over-weight and over-dimensional vehicles.

Of the four, construction materials and equipment, hazardous materials, and over-weight and over-dimensional vehicles appear to offer the greatest promise. The air cargo niche market faces significant physical hurdles. The following paragraphs describe these four potential niche markets, as well as obstacles and opportunities associated with each. None of these niche markets can be contemplated, however, without public policies that foster the use of freight ferries for these movements.

#### Hazardous Materials

The events of September 11, 2001 have resulted in a renewed emphasis on safety and security in transportation, which provides the context for creating a niche market for transporting hazardous materials. Of all the potential markets described in these pages, Hazmat appears to have the most significant potential as well as a successful example already in place (the Detroit-Windsor Freight Ferry) from which to draw upon for experience.

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<sup>9</sup> TAMS Consultants, Inc., Assessment of the Market Demand for New Jersey Ferry Services, p. 2-11.

<sup>10</sup> Ibid., p. 3-30.



**Background and Definitions:** Hazardous materials (Hazmat) are defined by the U.S. Secretary of Transportation as substances or materials "...capable of posing an unreasonable risk to health, safety, and property when transported in commerce...."<sup>11</sup> Hazmat transport is regulated by the federal government under the Hazardous Materials Regulations (HMR), Title 49 CFR. In general, HMR prescribes requirements for classification, packaging, hazard communication, incident reporting, handling, and transportation of hazardous materials. Enforcement falls to the relevant USDOT Administrations, in conjunction with local authorities.

Hazardous materials are now divided into nine classes: 1. explosives; 2. compressed gas; 3. flammable and combustible liquids; 4. flammable solids; 5. oxidizers; 6. poisons; 7. radioactive materials; 8. corrosives; and, 9. miscellaneous hazardous materials.<sup>12</sup> Across these classes, materials are further delineated according to their hazard level. For example, Class 1 explosives consists of the following subclasses: Division 1.1 mass explosives, such as dynamite and nitroglycerine; Division 1.2 explosives with a projection or blast hazard; Division 1.3 explosives with a minor blast hazard such as display fireworks; Division 1.4 explosives which pose a major fire hazard, such as consumer fireworks; Division 1.5 blasting agents; and Division 1.6 extremely insensitive explosives. (Formerly, explosives were categorized as Class A, Class B, or Class C; these have since been changed to classes 1.1 through 1.6. Under the older classification system, Class A explosives are detonating explosives, such as TNT, which are considered to pose the highest degree of hazard. Class B explosives pose a lesser degree of hazard and includes those which rapidly combust like some types of fireworks and flash powders. Finally, minimum hazardous materials are grouped as Class C and include such items as small arms ammunition and certain types of fireworks. Poisons were also assigned a Class A or B designation according to their toxicity. Class A poisons were considered to pose a hazard to life even in very small amounts; Class B poisons were considered to pose less of a hazard, but are presumed to pose a threat to health during transport. These classes and divisions have also been modified, primarily under Class 6, though Class 2, Division 2.3 is reserved for toxic gas.)

Some materials are considered so hazardous that they are forbidden for transport under HMR, while others are prohibited from transport by certain modes. Certain materials, or certain modes, require approval from the USDOT in order to be moved as stated in HMR. In cases where the material or method of transport is expressly prohibited, a shipper can apply for an exemption.<sup>13</sup> Of note, beginning in January 1, 2005, motor carriers of certain hazardous materials, including radioactive materials, explosives, toxic by inhalation materials, and methane, were required to hold a Hazardous Materials Safety Permit issued by the Federal Motor Carrier Safety Administration.<sup>14</sup> The permits are aimed at reducing the chance these materials could be used in a terrorist attack and at improving overall safety of Hazmat movements. To obtain and retain these permits, carriers must demonstrate a specified out-of-service rate and crash rating and have in place several required procedures for communications and inspections.<sup>15</sup> All Hazmat movements require placarding and many have additional federal packaging and labeling requirements as well.<sup>16</sup>

Trucks transporting any hazardous materials within the region must comply with USDOT regulations including, among other things, ensuring proper condition of containers and/or packaging, markings and labeling, placarding, and certifications. However, there are several substances not regulated by USDOT (e.g., acid or alkaline liquids containing less than 10% free mineral acid) that do face regulatory requirements when crossing PANYNJ or Metropolitan Transportation Authority (MTA) facilities.<sup>17</sup>

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<sup>11</sup> 49 CFR §105.5.

<sup>12</sup> For an extensive listing of Hazmat classifications, with modes of transport banned for different agents, see USDOT, Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Hazardous Materials and Safety (OHMS), "Hazmat Regulations and Interpretation: Hazmat Table," <http://www.myregs.com/dotrspa/>, Accessed online 6/30/05.

<sup>13</sup> PHMSA, OHMS, "Exemptions and Approvals," <http://Hazmat.dot.gov/exempapp/approvals/exsys.htm>, Accessed online 4/29/05.

<sup>14</sup> USDOT, Federal Motor Carrier Safety Administration (FMCSA), "Hazardous Materials (HM) Safety Permits," <http://www.fmcsa.dot.gov/safety-security/Hazmat/hm-permitting.htm>, Accessed online 4/29/05.

<sup>15</sup> Ibid.

<sup>16</sup> For a complete listing of all the Hazmat placarding, labeling, and packaging requirements, as well as transportation weight and mode restrictions, see FMCSA, Office of Hazardous Materials Safety, "Hazardous Materials Regulations and Interpretations: Hazmat Table," <http://www.myregs.com/dotrspa/>, Accessed online 7/15/05.

<sup>17</sup> Port Authority of NY & NJ (PANYNJ), *Hazardous Materials: Transportation Regulations at Tunnel and Bridge Facilities* (NY: PANYNJ, August 2004), p. 6, [http://www.panynj.gov/tbt/pdf/red\\_book\\_2004.pdf](http://www.panynj.gov/tbt/pdf/red_book_2004.pdf), Accessed online 4/29/05; Also, Metropolitan

**Creating a Niche Market:** Generally, because states are not allowed to impede interstate commerce, they are not allowed to modify the regulations and restrictions set forth in HMR. Nevertheless, while states cannot expressly prohibit substances allowed by HMR, they are able to regulate the movements of such substances. In the case of the Detroit-Windsor river crossing, explosive, flammable, radioactive and corrosive materials are prohibited from crossing the Ambassador Bridge and the Detroit-Windsor Tunnel between Detroit, Michigan and Windsor, Ontario. Thus, trucks carrying such materials may either use the Detroit-Windsor Ferry or travel over 100 miles out of their way to use an alternate bridge or tunnel.<sup>18</sup> As with Detroit-Windsor, there is an opportunity for the Port Authority and other agencies to lead in fostering a niche market for a freight ferry transporting Hazmat in the region.

Both the Port Authority and the MTA currently require advanced notification and stipulate specific routes for some Hazmat movements (Table 2). For Port Authority facilities, Class 1, Divisions 1.1-1.3 explosives are entirely prohibited from the George Washington Bridge, Bayonne Bridge, Goethals Bridge, and Outerbridge Crossing, although Divisions 1.4-1.6 explosives are allowed over them (on the George Washington Bridge, only the Upper Level). They are not allowed through the Lincoln or Holland Tunnels, nor are they allowed on the Lower Level of the George Washington Bridge. Restrictions are in place for all Class 1 Hazmat through the Holland and Lincoln Tunnels.

On the crossings where Class 1 explosives are allowed, trucks transporting these types of explosives require advanced notification, must cross at specified times (10am-3pm or 7pm-6am, Monday through Friday, and Saturdays and Sundays, traffic permitting), and must be escorted.<sup>19</sup> Additionally, for other types of Hazmat, there are also weight and/or quantity restrictions through the Holland (west-bound) and Lincoln Tunnels. Currently all truck traffic is banned on the George Washington Bridge Lower Level.

Restrictions are similar for MTA facilities, for which the latest documents available still distinguish between Class A and B explosives. With the exception of special fireworks “not in excess of 10 pounds gross weight per vehicle,” Class A and B explosives are not allowed on the Triborough, Bronx-Whitestone, Henry Hudson, Marine Parkway Gil Hodges Memorial, and Cross Bay Veterans Memorial Bridges, and the Verrazano-Narrows Bridge Upper Level. For the Throgs Neck Bridge, vehicles transporting such explosives in excess of 10 pounds gross weight per vehicle must obtain prior permission at least two hours before crossing, and must cross during specified hours (10am-3pm or 7pm-6am, Monday through Friday, and Saturdays and Sundays, traffic permitting).<sup>20</sup> Except for special fireworks not in excess of 10 pounds gross weight per vehicle, Class A and B explosives are not allowed in the Queens Midtown Tunnel, the Brooklyn Battery Tunnel or on the Verrazano-Narrows Bridge Lower Level. As with the Port Authority’s facilities, these three facilities also have weight and quantity restrictions for other Hazmat classes.<sup>21</sup>

New York City also has some of its own prohibitions in place. Tank truckloads of propane and liquid nitrogen gas are not allowed to pick up or make deliveries within the city, but they are allowed passage through the city via a specific route. Hazmat requiring approvals or exemptions also require an approval number from the Fire Department of New York (FDNY) and can only be moved between 10am and 3pm. For shippers who transport Hazmat regularly, a blanket approval can be issued for one year.<sup>22</sup>

The restrictions imposed by the Port Authority and MTA, as well as by the City of New York, place limitations on shippers both with respect to time of day they are permitted to move and the route they must travel. If structured appropriately, a freight ferry could provide a more flexible alternative.

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Transportation Authority (MTA), *Rules and Regulations Governing the Use of the Triborough Bridge and Tunnel Authority Facilities and the Transportation of Hazardous Material* (NY: MTA-TBTA, 2003), p. 17.

<sup>18</sup> Detroit-Windsor Truck Ferry, “Hazmat,” <http://www.truckferry.com/Hazmat.html>, Accessed online 3/24/05.

<sup>19</sup> PANYNJ, *Hazardous Materials*, pp. 3-4.

<sup>20</sup> MTA, *Rules and Regulations*, pp. 14-15.

<sup>21</sup> *Ibid.*, p. 23.

<sup>22</sup> Inspector John McCook, Fire Department of New York, Personal Communication, 3/24/05.

**Table 2. Selected Hazmat Restrictions by Authority and Facility**

Jurisdictional Authority	Facility	Explosives – Class 1 Divisions 1.1-1.6/Class A and B*	Other Hazmat	
MTA	Bronx-Whitestone Bridge	Class A Prohibited; Class B only special fireworks not in excess of 10 lbs. gross weight per vehicle	No atomic weapons or other forbidden explosives; No radioactive materials, except when type and quantity exempt from USDOT packaging, marking, labeling, and placarding (e.g. when component part of manufactured materials like a clock dial); Permit required and passage restricted by day/time for radioactive pharmaceuticals; Remainder must conform with federal, state, and city regulations	
	Triborough Bridge			
	Verrazano-Narrows Bridge – Upper Level			
	Throgs Neck Bridge	Permit required; Passage restricted by day/time		
	Brooklyn-Battery Tunnel	Class A Prohibited; Class B only special fireworks not in excess of 10 lbs. gross weight per vehicle		Several other Hazmat prohibited (e.g., formaldehyde solution); Class A poisonous materials prohibited (including empty containers); Various quantity restrictions by class and type of material
	Queens-Midtown Tunnel			
Verrazano-Narrows Bridge – Lower Level				
PANYNJ	Bayonne Bridge	Class 1, Division 1.1-1.3 Prohibited; Class 1, Division 1.4-1.6 only special fireworks not in excess of 10 lbs. gross weight per vehicle and only under escort and advance notice	No atomic weapons or other weapons of war (Class 7); No poisons or toxins, including empty containers (Class 6); No poisonous gas or water-reactive materials which produce toxic gases (Class 2.3).	
	George Washington Bridge – Upper Level			
	Goethals Bridge			
	Outerbridge Crossing			
	George Washington Bridge – Lower Level	Currently all truck traffic is banned though in emergency situations, trucks may be allowed on the lower level, with 100% truck checks.		
	Holland Tunnel	Currently all east-bound commercial traffic prohibited; Vehicle size and class limitations in place for west-bound commercial traffic; Class 1, 2, 3, 4, 5, 8, 9 Hazmat all have size and weight limitations; Class 2.3, 6, and 7 are prohibited.		
Lincoln Tunnel	Class 1, 2, 3, 4, 5, 8, 9 Hazmat all have size and weight limitations; Class 2.3, 6, and 7 are prohibited.			

Note: Previously, Class 1, Division 1.1 – 1.3 Explosives were included as Class A and Class 1, Division 1.4-1.6 were included as Class B. The Port Authority has been updating its designations to coincide with national designations; the latest MTA document still notes Class A and B explosives.

Sources: Port Authority of NY & NJ (PANYNJ), *Hazardous Materials: Transportation Regulations at Tunnel and Bridge Facilities*, DRAFT REVISION, January 2006, provided by PANYNJ staff; also, Metropolitan Transportation Authority, *Rules and Regulations Governing the Use of the Triborough Bridge and Tunnel Authority Facilities and the Transportation of Hazardous Material* (NY: MTA-TBTA, 2003).

A truck ferry could also prove faster, according to the report by TAMS Consultants, Inc. Though the section of the TAMS report dealing with comparative travel times focuses on passenger/transit routes, the figures are still useful for freight schedule modeling purposes. In fact, if anything, the times for trucks via highway are likely to be longer than what is shown for automobiles, since the latter have more choices. According to the report, with the exception of a route linking Newark Airport to downtown and midtown Manhattan, ferry service is faster than automobile travel. Other routes included Perth Amboy, South Amboy, and Edison linking to downtown or midtown, with time savings ranging from 11 to 22 minutes.<sup>23</sup>

Of additional importance are the security and safety benefits that a freight ferry could bring. The Port Authority and MTA both reserve the right to inspect any vehicle whose load includes or is believed to include any hazardous material. In times of heightened security alerts, spot checks are often performed, but with so many alternate crossings, the efficacy of such checks is questionable. By diverting all Hazmat

<sup>23</sup> TAMS Consultants, Inc., *Assessment of the Market Demand for New Jersey Ferry Services*, p. 2-5.

onto a single mode, security activities could be consolidated, providing opportunity for further efficiency and efficacy of spot checks and regular inspections as well as potential cost savings.

To encourage creation of such a ferry, the PANYNJ would have to adopt a policy similar to that which was taken in Michigan: Ban all major Hazmat from all its bridges and tunnels, in effect, forcing trucks carrying hazardous materials onto an alternate route – in this case, a freight ferry.

### Over-weight and Over-dimensional Vehicles

Over-weight and over-dimensional vehicles (OW/OD) are those vehicles which exceed weight, height, or width constraints imposed by a transportation agency or authority on a transportation facility. In the New York metropolitan region, such vehicles mostly haul indivisible loads in the form of heavy machinery, with excavators, cranes and bulldozers common cargo.<sup>24</sup> A growing segment of commercial vehicle movement is in OW/OD vehicles. While the number of over-weight vehicles crossing Port Authority bridges fluctuated by facility between 2002 and 2004, the total number of such vehicles crossing all Port Authority bridges rose steadily, with almost 14% more crossing in 2004 than in 2002 (Table 3).

Weight, width, and length limitations are imposed on vehicles carrying freight at a number of locations within the New York metropolitan region. In the case of the Port Authority's facilities, these limitations are stipulated for various kinds of vehicles. For example, single unit vehicles cannot exceed an overall length of 45 feet, including load or contents, combination truck tractor and trailer configured vehicle cannot exceed an overall length of 70 feet, while automobile transporters cannot exceed 75 feet in length.<sup>25</sup> Importantly, these limitations differ as trucks move across jurisdictional boundaries within the region.

**Table 3: Over-weight Vehicle Totals<sup>26</sup>**

	2002	2003	2004
Bayonne Bridge	8	15	34
Goethals Bridge	509	425	443
Outerbridge Crossing	68	258	165
George Washington Bridge	227	196	282
Total	812	894	924

Source: Ronnie Taste, PANYNJ

Table 4 provides a listing of restrictions across jurisdictions for the 5-axle truck-semi-trailer combination vehicle, the most prevalent type of truck in the United States, comprising 43% of the fleet. Used for both long and short hauls, in urban and rural areas, the truck semi-trailer combination typically weighs 80 to 90 thousand pounds, but because of differing highway dimension limitations throughout the United States there is no industry standard size.<sup>27</sup>

Permitting for such vehicles requires multiple steps since each agency or authority requires its own permitting and each has different rules and days for how and when OW/OD vehicles can move across roadways in their jurisdiction (Table 4). To give a sense of the challenge faced by a trucker moving across the various jurisdictions, it is helpful to provide a brief hypothetical example.

Let us assume that a crane arrives at Port Newark/Elizabeth Marine Terminal for transport to Long Island for use in a construction project. The first difficulty is likely to be idling time at the Port facility itself since idling times of up to six hours are increasingly common due to increased business at the PANY/NJ's

<sup>24</sup> Adrienne C. Holmes, Manager Operations & Maintenance Services, PANYNJ, Personal Communication, 1/27/05.

<sup>25</sup> The Port Authority of NY&NJ (PANYNJ), *Traffic Rules and Regulations* (NY: PANYNJ, June 2004), [http://www.panynj.gov/tbt/pdf/green\\_book\\_2004.pdf](http://www.panynj.gov/tbt/pdf/green_book_2004.pdf), Accessed online 2/3/05.

<sup>26</sup> Similar figures for over-dimensional vehicles were unavailable from the Port Authority.

<sup>27</sup> USDOT, FHWA, "Comprehensive Truck Size and Weight Study: Summary Report," (August 2000) <http://www.fhwa.dot.gov/reports/tswstudy/Vol1-Summary.pdf>, p. 15.

ports.<sup>28</sup> If the crane were to be transported directly to Long Island, the truck carrying it would have to use the tolled New Jersey Turnpike to reach New York City because vehicles exceed 96" in width that are only crossing through New Jersey are not allowed to use local highways. A permit, which is only good for one day out of three potential dates, would have to be procured beforehand to use the Turnpike.

Once on the Turnpike, there are several options for the truck to enter New York – via the George Washington Bridge, the Goethals Bridge, and the Outerbridge Crossing. Regardless of how the truck enters New York, it would need a permit from New York State Department of Transportation, which would be good for five days. Before entering the actual bridge facility, the operator would also need to arrange in advance with the Port Authority of NY&NJ for permitting and escort services. Tolls for such vehicles are doubled and then assessed a \$25 escort fee. Permitted hours of travel are Monday through Friday, from 10am to 3pm and from 8pm to 5am, and on Saturdays and Sundays, traffic permitting.<sup>29</sup> Permits are provided for a specific date and time and the truck must arrive in time to be escorted across, which often means getting there several hours in advance to avoid getting stuck in traffic, and then being stored while waiting for the escort.

**Table 4: Regulations and Restrictions for Over-weight and Over-dimensional Truck-Semi-trailers in New York and New Jersey**

	National Highway System	New Jersey	New York State	New York City	Port Authority Bridges
Able to use Parkways?	N/A	No	No	No	N/A
Height Cannot Exceed (feet)	No limit	No limit	13.5	13.5	14
Width Cannot Exceed (inches)	102	102*	102**	96	102
Overall Length Cannot Exceed (feet)	No limit	N/A	65***	55'	N/A
Trailer Length Cannot Exceed (feet)	No limit	53	48 <sup>†</sup>	48 <sup>††</sup>	70
Maximum Weight (pounds)	80,000	80,000	80,000	73,280	80,000
Permit Duration	State Determined	Daily	Five Permissible Hauling Days	Daily	Manager's Discretion

Notes: \*Allowed for all vehicles on the National Network, but only for vehicles making deliveries in New Jersey on the Access Network; otherwise, vehicles are restricted to 96" in width. \*\*If traffic lane is ten or more feet wide, 96" otherwise. \*\*\*No limit on Access Highways. <sup>†</sup>On State Highways, 53' on Access Highways. <sup>††</sup>53' trailers are allowed on portions of I-95, I-695, and I-495 from the Bronx-Westchester County line to the Queens-Nassau County line.

Sources: Federal Highway Administration, *Freight Management and Operations*, "Commercial Vehicle Size and Weight Program," FHWA-OP-03-099 (May 2003), <http://www.ops.fhwa.dot.gov/freight/sw/overview/index.htm>, Accessed online 2/3/05; New Jersey Turnpike Authority, "Regulations Relating to the Control of Traffic on the New Jersey Turnpike," <http://www.state.nj.us/turnpike/tpreg.pdf>, Accessed online 2/3/05; New York State Department of Transportation, "Legal Dimensions, Weights, & Gross Weights for New York State," [http://www.dot.state.ny.us/nypermits/files/div\\_load/perm71.pdf](http://www.dot.state.ny.us/nypermits/files/div_load/perm71.pdf), Accessed online 2/3/05; New York City Department of Transportation, "Vehicle Permits for Commercial Use," <http://www.nyc.gov/html/dot/html/permits/commperm.html>, Accessed online 2/3/05; PANYNJ, "Traffic Rules and Regulations."

The operator would also have to apply for and receive another permit from the New York City Department of Transportation (NYCDOT) to transport OW/OD cargo in New York City since it would be traversing the City to get to Long Island. Like those in New Jersey, these permits are only valid for one day and may only be granted for loads that are not divisible. If a load is deemed divisible, it must be divided for transport in New York City.<sup>30</sup> Once the truck crosses into New York City, it would still need to use one of several bridges, to cross to Long Island; likely the Verrazano-Narrows Bridge if the initial crossing utilized

<sup>28</sup> Damien Cave, "Contract Truckers Feed the Ports, for as Little as \$40 a Load," *The New York Times* (2 December 2004): B-1.

<sup>29</sup> Port Authority of NY & NJ, *Traffic Rules and Regulations*, (NY: PANYNJ, June 2004), p. 33, [http://www.panynj.gov/tbt/pdf/green\\_book\\_2004.pdf](http://www.panynj.gov/tbt/pdf/green_book_2004.pdf), Accessed online 2/3/05.

<sup>30</sup> Personal communication, Dorothy Roses, Executive Director, Management & Support Services, Division of Bridges, New York City Department of Transportation, 7/28/05.

the Goethals Bridge or Outerbridge Crossing, and the Bronx Whitestone Bridge or Throgs Neck Bridge if the initial crossing was made at the George Washington Bridge.

In each of these cases, yet another permit would be required, this time issued by the Metropolitan Transportation Authority for crossing the bridge. Additionally, at these crossings over-weight and over-dimensional vehicles would pay “double the appropriate toll rate.”<sup>31</sup> After crossing any of these bridges, the one-daily permit from NYCDOT would still be active, assuming the truck was still within the one-day time interval as would the five-day New York State permit. No additional permit would be needed in Long Island, as the five-day permit from NYSDOT should still be in effect.

Thus, transporting an OW/OD vehicle from New Jersey to Long Island could potentially require as many as five different permits from five different agencies, each requiring a separate application and fee and each imposing different types of restrictions regarding time allowances.

**Creating a Niche Market:** Although volumes are growing on Port Authority facilities, on their own OW/OD volumes are unlikely to generate a niche market. By weight, machinery (the commodity most likely to be transported on OW/OD vehicles) represents less than 2% of commodities moved in the New York metropolitan region.<sup>32</sup> The share of manufactured equipment, machinery and products is also low at the port; only 5% of total traffic by weight at the Port of New York & New Jersey is in the form of equipment and machinery.<sup>33</sup> Indeed, because of the size and weight of such machinery, very few are transported from distant locations. Instead, most American companies purchase heavy equipment from local distributors. Consequently, it makes little economic sense in the current market to charter a freight ferry for the one-time movement of a crane.

Nevertheless, given the hassle of transporting OW/OD cargo on trucks within the New York City metropolitan area, a freight ferry operation directly across the Harbor could simplify travel. If there were an endpoint in Brooklyn, for example, the number of permits could be reduced by as many as two (the PANYNJ and MTA). If higher fees, higher fines and better enforcement were all implemented at the same time a ferry operation was started, a niche market could be created and, again, the Port Authority is in a position to help lead such an effort.

### **Construction Materials and Equipment**

There is also an opportunity in the New York metropolitan region to foster a time-defined niche market for vehicles hauling construction materials and equipment, similar to that seen in the case of the Quincy-Deer Island Freight Ferry. A number of very large construction projects are being planned or are proposed by the public sector for the New York metropolitan area. These projects are expected to begin and be completed within the next two decades (Table 5). Any one of these projects will be larger than the Deer Island Project and each will require a great deal of construction material, OW/OD construction equipment necessary for the projects, and removal of the resulting debris.

There is a unique opportunity at this time to make an administrative decision that would foster the emergence of a freight ferry operation to transport construction materials and equipment related to these projects.

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<sup>31</sup> MTA, Rules and Regulations, p. 9.

<sup>32</sup> NYCDEC, Cross-Harbor Freight Movement Project – Draft Environmental Impact Statement, Appendix 2B: Commodity Flow Analysis, p. 9.

<sup>33</sup> DMJM+Harris, "Traffic Statistics/Projections," Presentation for Port Authority of NY & NJ, Provided by the PANYNJ.

**Table 5: Selected Proposed and Potential Megaprojects in the New York Metropolitan Region**

Project	Cost	Construction Begins	Projected Completion Date	Estimated Number of Truck Trips Required
Second Avenue Subway	\$16.8 billion	2005	2021	200,000
Redevelopment of the World Trade Center site	\$9 billion	2006	2009	Unknown
East Side Access	\$6.3 billion	2001	2012	Unknown
Access to the Region's Core	\$6 billion	2006	2012	Unknown
Rail Link to JFK	\$3-6 billion	2007	2013	Unknown
7 Line Extension	\$2.1 billion	2005	2010	71,137
New Yankee Stadium	\$1.1 billion	2006	2009	Unknown
Fulton Street Transit Center	\$750 million	2004	2007	Unknown

Notes: \*The various components for the entire project are projected to be completed by 2025, but the subway component is expected to be completed by 2010.

Sources: Metropolitan Transportation Authority (MTA), 2005-2009 Proposed Capital Program (NY: MTA, September 2004), [http://www.mta.info/mta/budget/pdf/capitalprogram\\_proposed.pdf](http://www.mta.info/mta/budget/pdf/capitalprogram_proposed.pdf), Accessed online 4/21/05; MTA, "Industry Briefing," (May 2004): 8, <http://www.mta.nyc.ny.us/capconstr/sas/pdf/industrybriefing.pdf>, Accessed online 04/21/05; and, Federal Transit Administration and MTA, Second Avenue Subway: Final Environmental Impact Statement (FEIS), chapter 3 (April 2004), pp. 3-29, <http://www.mta.nyc.ny.us/capconstr/sas/feis/pdf/chapter03.pdf>, Accessed online 4/21/05; Parke Chapman, "Office Glut at Ground Zero," National Real Estate Investor 47, 1 (January 2005): 41, <http://proquest.umi.com/pqdweb?did=780177511&sid=11&Fmt=4&clientId=9269&RQT=309&VName=PQD>, ProQuest, Retrieved 5/17/05; Elizabeth O'Brien, "Silverstein Wants \$3.5B for WTC Site: Seeks All Remaining Liberty Bond Funds," Bond Buyer 352, 32117 (April 22, 2005): 1, <http://proquest.umi.com/pqdweb?did=828861621&sid=10&Fmt=3&clientId=9269&RQT=309&VName=PQD>, ProQuest, Retrieved 5/17/05; MTA, "East Side Access MTA Long Island Rail Road Grand Central Connection: Project Schedule," <http://www.mta.nyc.ny.us/capconstr/esas/schedule.html>, Accessed online 4/21/05; Parsons/SYSTRA Engineering, Inc., Lower Manhattan Airport and Commuter Access Alternatives Analysis: Final Report – Task 7 (NY: Lower Manhattan Development Corporation, 2004), <http://www.renewnyc.com/content/pdfs/LMRailLink.pdf>, Accessed online 7/5/05; Judy Rife, "Commuter Rail Tunnel Construction Would Create New Jobs in Corridor," Knight Ridder Tribute Business News (Washington, DC: 10 February 2005), p. 1. New York City Department of City Planning, Hudson Yards Environmental Impact Statement, <http://nyc.gov/html/dcp/html/hyards/eis.html>, Accessed online 6/10/05; MTA and the City of New York City Planning Commission, Final Generic Environmental Impact Study (June 2004), pp. 23-18 to 23-19, [http://nyc.gov/html/dcp/pdf/hyards/hy\\_chap23\\_t\\_fgeis\\_final.pdf](http://nyc.gov/html/dcp/pdf/hyards/hy_chap23_t_fgeis_final.pdf), Accessed online 4/21/05; T.J. Quinn, "Bronx Beep Goes to Bat for Stadium," New York Daily News (April 22, 2005), <http://www.nydailynews.com/sports/story/302491p-258973c.html>, Accessed online 5/17/05; MTA, "MTA Capital Construction – Fulton Street Transit Center," <http://www.mta.nyc.ny.us/capconstr/fstc/>, Accessed online 5/03/05; and, MTA, "MTA Capital Construction – Fulton Street Transit Center: Project Schedule," <http://www.mta.nyc.ny.us/capconstr/fstc/schedule.htm>, Accessed online 5/03/05.

### Air Cargo to/from JFK

In 2004, John F. Kennedy International Airport (JFK) was the 6<sup>th</sup> largest U.S. cargo airport in terms of weight of goods moved, with over 1.7 million metric tons of cargo.<sup>34</sup> Highway access for air cargo to and from JFK has been an ongoing area of concern, and has been pointed to as a critical constraint to the future growth of the airport's cargo business. The most commonly used route for five and six-axle trucks entering and leaving the facility is the George Washington Bridge to the Cross Bronx Expressway to the Van Wyck Expressway.<sup>35</sup> The route is heavily congested and lengthy delays because of traffic are not unusual during peak periods. Trucks are not currently allowed on the Belt Parkway route to the airport, nor is it desirable for the trucks to use local roads. In addition, legal access routes for trucks hauling the 53-foot trailers, now standard in the United States, are extremely limited. In fact, currently, it is not legal for a 53-foot trailer to travel on existing routes to JFK.

**Creating a Niche Market:** Air cargo, by its nature, is time-sensitive. Therefore, a truck ferry could potentially be competitive if the service provides a predictable and but not lengthy travel time to the airport. It may be possible to arrange for these inspections to occur at the ferry terminal prior to arrival at JFK while the trucks are waiting for the vessel. Trucks could then be permitted directly onto airport property. It is assumed that any shipments departing from JFK will have cleared U.S. Customs or be traveling "in bond" for Customs clearance elsewhere.

<sup>34</sup> Airports Council International – North America. <http://www.aci-na.org/asp/traffic.asp?art=216>.

<sup>35</sup> URS Corporation, *John F. Kennedy International Airport Air Cargo Truck Movement Study*, Prepared for the PANYNJ (New York: URS, May 2002), p. 18.

The *Hunts Point* study conducted by Cambridge Systematics, Inc. for the New York Metropolitan Transportation Council (NYMTC) identified a possible terminal location at JFK in the Bergen Basin (Figure 2). However, the *Hunts Point Study* also identified three impediments to potential ferry service:

**Figure 2. Location of Potential Truck Ferry Terminal Location at JFK**



Source: Cambridge Systematics, Inc., *Hunts Point Waterborne Freight Assessment, Prepared for NYMTC (August 18, 2004)*, p. 51.

- The Bergen Basin currently has a depth of less than 10 feet. Channel deepening and maintenance to a depth of 15-to-24 feet or specially constructed shallow draft vessels would be required.
- Two bridges cross over the access to the Bergen Basin, resulting in an air draft of 26 feet, low for a conventional ferry or tug.
- Jamaica Bay is the largest national wildlife refuge in the United States, and part of the Gateway National Recreational Area. As such, there are wake, speed, noise and emission restrictions that would have to be met by the ferry vessel. Reduced speed could extend the travel time to an unattractive length for drivers and make the service non-competitive with roadway options. Wake, noise and emission restrictions may also require a custom built vessel, which would raise the costs associated with the initial investment and service.<sup>36</sup>

While these impediments could potentially be overcome (for example, an interviewee noted that tugboats on the Erie Canal have been designed to deal with air draft restrictions), they do pose significant hurdles for implementation of a truck ferry servicing air cargo.

<sup>36</sup> Cambridge Systematics, Inc., *Hunts Point Waterborne Freight Assessment: Opportunities to Meet the Community's Freight Transportation Needs through Waterborne Strategies, Draft Final Report, Prepared for NYMTC (August 18, 2004)*, pp. 51-52.



### 3. THE CASE STUDIES

Section 2 described the potential niche markets that could serve to begin a freight ferry service in the New York metropolitan region. This section examines four case studies from other areas of the United States to exemplify how these niche markets have been filled elsewhere as well as lessons learned that could help develop a successful freight ferry in this region.

#### DETROIT-WINDSOR TRUCK FERRY

Operating since 1990, the Detroit-Windsor Truck Ferry is an enduring U.S. example of a successful freight ferry operation. Primarily directed at hazardous materials movement, the ferry service has also attracted over-dimensional shipments as well as some expedited, time sensitive shipments.

It is included here because it provides an example of a niche market for hazardous materials and is most similar to the type of operation that could be created in the NY/NJ Harbor. Further, as one of the few successful freight ferry examples, it provides several lessons as well as a model to emulate.

#### Niche Markets Illustrated and Served

- Hazardous materials and commodities prohibited from using the local bridge and tunnel crossings.
- Over-dimensional shipments by truck.
- Some expedited, time sensitive services (e.g., FedEx).

The availability of bridge and tunnel crossings in the immediate area, combined with the cost and limited availability of Canadian Customs, has resulted in the operator focusing on “high revenue” toll markets. Specifically, the operation is focused on those commodities not permitted to use the crossings in the immediate area. All forms of hazardous materials, including explosives and radioactive material, are handled on the ferry.

In addition, the operator has been successful in attracting over-weight and over-dimensional vehicles because of the relative ease of using the ferry over making arrangements at the alternative crossings. For example, the ferry has handled house trailers which require escorts across the bridges, and double trailers filled with soybeans weighing 140,000 pounds, which is well over the 80,000 gross vehicle weight standard for trucks.

#### Overview of the Operation

The Detroit-Windsor Truck Ferry service began in 1990 and runs between Detroit, Michigan (US) and Windsor, Ontario (Canada) on the Detroit River. Developed and run by a private sector company, the service is a for-profit operation and has generally generated a profit. According to the Port Windsor web site, the truck ferry handled over 109,300 metric tons of freight in 2004, up from 91,900 metric tons in 2003. This represents a 19% growth between the two years.<sup>37</sup>

**Figure 3. Detroit-Windsor Truck Ferry**



Source: Detroit-Windsor Truck Ferry, <http://www.truckferry.com>

<sup>37</sup> See Detroit-Windsor Truck Ferry, <http://www.truckferry.com>, Accessed online 3/24/05.

The nearby Ambassador Bridge and Detroit-Windsor Tunnel, both privately-operated, connect the United States and Canada, but the crossings currently prohibit the movement of certain hazardous materials – Class 1-explosives; Class 3-flammable and combustible liquids; Class 7-radioactive; and Class 8-corrosives at the Ambassador Bridge, and all placarded materials at the Detroit-Windsor Tunnel.

The restrictions on the Ambassador Bridge date back over 50 years, and according to John and Gregg Ward, the bridge authority has cited insurance liability as the primary reason for this ban.<sup>38</sup> In the case of the Detroit-Windsor Tunnel, the decision to prohibit certain classes of Hazmat was solely a corporate decision, and was based on the Code of Federal Regulations (CFR):

(a) Unless there is no practicable alternative, a motor vehicle which contains hazardous materials must be operated over routes which do not go through or near heavily populated areas, places where crowds assemble, tunnels.... Operating convenience is not a basis for determining whether it is practicable to operate a motor vehicle in accordance with this paragraph.<sup>39</sup>

The only crossings that permit the movement of such materials, the Blue Water Bridge and International Bridge, are located some distance away (the closest is 165 miles).<sup>40</sup> The Ward family recognized the business opportunity to speed truck crossings and started up the Detroit-Windsor Truck Ferry. No public support was offered or used during the initiation of service.

The physical operation consists of trucks loaded onto a barge. Drivers remain in the cab of their vehicles during the 20-minute transit time; they are not allowed out of their vehicles. While cars can use the ferry, the operation is focused on truck movements. Generally, the barge can handle eight trailers. Each terminal occupies a two-acre site, both located in industrial areas. The Canadian side is a general cargo area, using 150 feet of sea wall. The U.S. side neighbors are cement silos and U.S. Steel.

The barge was not “purpose built;” rather, an existing barge and tugboat are used. The barges are used as ramps at both terminals allowing trucks to be driven directly on and off the barge. According to Gregg Ward, Vice President of Detroit-Windsor Truck Ferry, this “4000 year old technology is extremely flexible, needing only 300 feet to implement service. A minimal footprint is needed, operational with 50 feet cleared for ramps.”<sup>41</sup>

The ferry operates as a scheduled service, with reservations generally required. About 80% of the vehicles use the reservation system. Beyond the reservation process, it also has negotiated several specific contracts with steel companies. The contracts provide a subscription type of service, with regular trips booked in advance for a specified price. The ferry makes five round trips daily from Monday through Friday, with no service offered on Saturday and Sunday. Service begins at 7am with the final run from Windsor to Detroit leaving at 4pm. The days and hours of service have been dictated by the availability of the Canadian Customs Service. The ferry operator pays for the Canadian Customs Service, and U.S. and Canadian Customs are located on the respective terminals of the operations, permitting immediate clearance of people and cargo with the appropriate documentation. The ferry is considered an extension of the highway land border crossing standard and the associated regulations apply.

**Rate Structure:** The current fee structure for the ferry is shown in Table 6. It is worth noting that the fees and tolls on the Blue Water Bridge and International Bridge, which allow Hazmat, but are much further away, are substantially lower. At the Blue Water Bridge, trailers are charged \$1.50/axle and trucks are

<sup>38</sup> John T. Ward and Gregg M. Ward, “Excuse Me for Barging In: Establishment of a Hazardous Materials Ferry Between Detroit and Windsor,” *Transportation Research Record* 1602, Paper No. 970759 (Washington, DC: TRB, 1997): 77.

<sup>39</sup> 49 CFR Part 397, section 9, as cited in Ward and Ward, “Excuse Me for Barging In,” p. 77.

<sup>40</sup> Note that there is a discrepancy here between what is reported in the Federal Register by the FMCSA and what was reported during telephone calls to Detroit-Windsor Tunnel and Michigan Department of Transportation (MDOT) authorities. The Federal Register notes restrictions at the Tunnel, but a tunnel representative noted that all placarded materials are prohibited. Similarly, the Federal Register notes restrictions at the Blue Water Bridge, but the representative from MDOT stated that materials are allowed over the bridge, though permission and escorts must be granted in certain cases. FMCSA, *Federal Register* 65, 233 (December 4, 2000), <http://www.fmcsa.dot.gov/rules-regulations/administration/rulemakings/12-4-2000.htm>. Accessed online 8/1/05. Also, Personal communication, Suzanne Benton, Motor Carrier Specialist, Intermodal Office, MDOT 7/22/05 and 8/1/05, and Personal communication, Neil Belitsky, Executive Vice President & General Manager, Detroit Windsor Tunnel, 8/1/05.

<sup>41</sup> Personal communication, Gregg Ward, Vice President, Detroit-Windsor Truck Ferry, 5/11/05.

charged \$1.75/axle. Trucks at the International Bridge average between \$9.00 and \$23.00. There are no fees for escorts.<sup>42</sup> In addition, the operator has negotiated special rates for steel companies moving volume traffic on the ferry, showing responsive customer service. All of the capital funding for the operation came from private sources. The current operation is self-sustaining and generally profitable.

**Issues and Considerations**

Among the issues and considerations specific to this case are:

- Initial environmental concerns;
- The availability of Canadian Customs Service;
- The Harbor Maintenance Tax; and
- Security and safety considerations.

**Table 6. Current Fee Structure on the Detroit-Windsor Truck Ferry**

Commercial Vehicles: (including driver and passengers)	Current Rates
Escort	\$ 5.00
Tractor Only	\$ 30.00
Van or Pick-up	\$ 60.00
Straight Truck	\$ 85.00
Tractor-Trailer - less than 80,000 GVW and less than 80' length	\$ 115.00
• Over width only - less than 10' wide and less than 80,000 GVW* and less than 80' length	\$ 115.00
• Over width only - between 10'-14' wide and less than 80,000 GVW* and less than 80' length	\$ 200.00
• Over width only - between 14' - 16' wide and less than 80,000 GVW* and less than 80' length	\$ 250.00
• Over height only- less than 80,000 GVW* and less than 80' length	\$ 250.00
• Over height and over width - less than 100,000 GVW* and less than 80' length	\$ 500.00
Heavy lift - greater than 80,000 GVW* and less than 150' length	\$1,100.00
Superload - greater than 80,000 GVW* and greater than 150' length	\$1,650.00

Source: Detroit-Windsor Truck Ferry, <http://www.truckferry.com>

**Initial Environmental Concerns:** When the ferry was first announced, local environmental groups objected. In 1990, start-up of services coincided with Earth Day, and environmental groups were “intensely opposed” with concerns focused on potential accidental spills into the water. Once the ferry was operational, the environmental groups became supporters, now seeing the ferry as “the good guys.”<sup>43</sup> The environmental groups now feel that the ferry offers a means for removing hazardous materials

<sup>42</sup> Michigan Department of Transportation, “Bridge Tolls,” [http://www.michigan.gov/mdot/0,1607,7-151-9618\\_11010---,00.html](http://www.michigan.gov/mdot/0,1607,7-151-9618_11010---,00.html), Accessed online 8/1/05; and “Placarded Vehicles,” [http://www.michigan.gov/mdot/0,1607,7-151-9618\\_11032\\_29850---,00.html](http://www.michigan.gov/mdot/0,1607,7-151-9618_11032_29850---,00.html), Accessed online 8/1/05.

<sup>43</sup> Personal communication, Ward.

movements from the existing roadway network, reducing the potential for accidents and spills on these routes. According to the operator, there have been no environmental incidents with the ferry operation to date. There was no opposition from neighbors to the terminals.

**Availability of Canadian Customs Service:** The limited hours of operation available from the Canadian Customs Service has, in the opinion of the ferry operator, significantly reduced his ability to meet the demand for the ferry service. He estimates that if Canadian Customs were available at the times desired by the customers, the ferry service would use two barges and operate 16 hours a day, 6 days a week. Currently, he feels that he can only use his equipment 30% of the time. Financially, the current situation does not justify additional barges or service. As required by Canadian customs regulation, the Detroit-Windsor Ferry operation pays for the Canadian Customs officers. Ward notes that the Rochester Ferry will also be required to pay for the Canadian Customs officers. All other crossings are not required to pay, since they are fixed and grandfathered in terms of Canadian customs officers.<sup>44</sup>

**Harbor Maintenance Tax (HMT):** The HMT is supposed to be paid on all inbound movements by water to the United States by the companies using the barge service. Periodic audits are conducted by the federal government, according to the operator, and can lead to significant fines for customers. For this reason, Ward noted that while FedEx and Yellow move full trucks to Canada via the ferry (for expedited, scheduled service), these companies only move empty trucks back to avoid this tariff issue. Additional discussion of the HMT is provided in Section 4.

**Security and Safety Considerations:** The ferry has received three Security Grants from the federal government. These grants were for data mining, searching and clearing for truck movements. In addition, the Department of Homeland Security (DHS) sees the ferry as an excellent example of how to expedite border movements; DHS has been challenged to increase border crossing throughput by 25%. Further, DHS views the ferry as a safer means for moving hazardous materials. The operator noted that a DHS official commented “if the ferry blows up, it is replaceable. If the bridge blows up, it is less replaceable.”<sup>45</sup>

Ward notes that the Coast Guard safety requirements for ferry services are simple and standard in use on all ferries. They include keeping drivers in the cab, chocking the tires of the vehicle, turning off engines and lights, and having appropriate safety equipment.

### **Lessons Learned and Applicability to NY/NJ Harbor**

The operator felt that a truck ferry focused on the same niche markets would be viable in the NY/NJ Harbor if only for security purposes. The operator noted the following lessons for developing a ferry service in the NY/NJ Harbor:

- Keep the capital costs low by using existing equipment. Use existing barges and tug boats. Barges can also be used as ramps at the terminals. Terminals can be kept to a small footprint.
- Have a reservation service to minimize the amount of space required at the terminals; obtain advanced information on hazardous materials and over-dimensional movements.
- Scheduled service, with adequate frequencies, is needed to attract the market. Favorable length of travel time compared with alternative crossings is also essential.
- Predictable travel times are required for the customer base.

### **QUINCY-DEER ISLAND FERRY**

The Deer Island Ferry was in place for a decade in the Boston Harbor, from 1990 to 2000, and served as a means for shuttling construction materials from the mainland to Deer Island for development of a wastewater treatment plant.

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<sup>44</sup> Personal communication, Ward.

<sup>45</sup> Ibid.

It is included here because it provides an example of a niche market for construction equipment as well as a time-defined service similar to what could occur to deal with construction and over-weight and over-dimensional vehicles being used for the various New York metropolitan area projects over the next few decades.

#### **Niche Market Illustrated and Served**

- Construction equipment/truck ferry during a major multi-year project.
- Ferry market created as a result of a public agency decision.

The Deer Island Ferry was designed to meet the need to convey a significant amount of construction material to a site for a prolonged period of time in a manner that reduced the negative impacts on the neighboring community. Of note, the “market” was created through a public policy decision to barge material and personnel.

**Figure 4. Deer Island Treatment Plant**



Source: Massachusetts Water Resources Authority

#### **Overview of the Operation**

The Massachusetts Water Resources Authority (MWRA) sponsored this service for 10 years during the construction of the \$3.8 billion wastewater treatment plant on Deer Island in Boston Harbor. Over the 10-year period, the ferry service handled 464,000 trucks and approximately \$2.2 billion worth of cargo. No trips were ever cancelled nor were any claims filed for damage to cargo.<sup>46</sup>

The treatment plant was a major component of an environmental clean up of the Boston Harbor mandated by the U.S. Federal District Court. The court specified a schedule for the clean up commencing in May 1986. The Deer Island site, adjacent to the Town of Winthrop, MA, was selected as the location for the primary and secondary treatment plants. The existing roads in the town, however, were not engineered to handle the quantity and heavy weight traffic required over the construction project. MWRA and the town agreed to a memorandum of understanding (MOU) in 1988 that, among other elements, was designed to minimize disruptions to the economic, environmental and cultural vitality of Winthrop. This included mitigating the negative transportation impacts related to the project, which consisted of the movement of equipment and construction personnel. MWRA agreed to ferry at least half of the daily construction workforce to the site. All equipment and materials required for the project would be ferried separately. Approximately 10 acres of a former shipyard dock in Quincy, MA were used for the ferry operation and as a staging area.

The physical operation of the freight ferry consisted of trucks and construction equipment (e.g., bulldozers, cranes) loaded onto a specially designed barge. Drivers were not permitted to move their vehicles onto the barge; the operator, Boston Towing, retained a trucking service – Pennsylvania Truck Lines – for this purpose. Drivers were also not permitted to travel with their vehicles on the barge; rather, they were required to ride a separate 40-passenger “runabout” vessel for the one-hour trip. The runabout also served as an auxiliary tugboat for maneuvering the barge into the transfer bridges.

If the drivers had remained with their vehicles, the operation would have been subjected to additional expenses associated with U.S. Coast Guard requirements, including life saving equipment and barge inspection. The Coast Guard, according to the interviewees, does not typically inspect deck barges.

The two barges were designed for the project by Seaworthy Systems and constructed by NABRICO of Nashville, TN. Each barge was designed with 15,800 square feet of deck space with the capacity for 25

<sup>46</sup> Massachusetts Water Resources Authority, *Ferries and Barges no Longer Needed to Fuel Boston Harbor Project*, Press Release, January 15, 2001

55-foot tractor-trailers and a maximum allowable wheel load on deck of 15 tons per trailer axle. The barges were designed to be maneuvered by existing tugboats operated by Boston Towing.

The freight ferry operated as a scheduled service, with reservations required. Construction management staff determined the delivery priority of the shipments and provided information to the operator 24 hours prior to each trip. The information included data on cargo types, value, and vehicle dimensions and weight. Vehicles were required to arrive at least one hour prior to departure for a pre-boarding inspection as mandated by the Federal Highway Administration and the Federal Railroad Administration intermodal regulations.

Frequency of service varied over the course of the construction project. One barge operated twice a day, five days a week, in both directions for about two years. Service then expanded to two barges, each operated twice daily (morning and afternoon) for about five years. Service was again reduced to a single barge during the remainder of the project.

**Rate Structure:** The ferry was not a for-fee service; the drivers did not pay a fee to use it. Instead, the MWRA decided to consolidate and coordinate all transportation related activities for the treatment plant construction at the inception of the project. The authority paid for equipment, consisting of two custom-built barges, four transfer bridges, and purchase of a site in Quincy, MA (formerly the General Dynamics Shipyard), along with the barge operations. The four transfer bridges, two at Quincy and two at Deer Island, cost approximately \$2.5 million each.<sup>47</sup>

The entire water transportation cost (construction and operation), including both the freight ferry and the construction worker ferries (a separate contract from the freight operation) totaled \$81 million over the 10 years of the project. The estimated cost of the freight operation alone was between \$35 and \$40 million.<sup>48</sup>

### Issues and Considerations

Among the issues and considerations specific to this case were the following:

- A court mandated schedule for completion of the project – the project had to be completed on schedule and, therefore, required a very reliable means for the transportation of needed materials;
- The community concerns of the Town of Winthrop – the roads could not handle the anticipated traffic and, to maintain the mandated schedule, quick resolution of concerns was needed; and
- US Coast Guard regulation-related expenses – according to the interviews, the approach taken – separating the drivers from the vehicles, helped reduce the cost of operating the barge service.

It is worth noting that because there was no fee charged to the individual truck drivers for the service (the cost of the barge was paid entirely by MWRA), the Harbor Maintenance Tax was not applicable and did not have any impact on service.

### Lessons Learned/Applicability to NY/NJ Harbor

The interviewees felt, and a review of the available material indicated, that a similar truck ferry for major construction projects, particularly in Manhattan, could be viable in the NY/NJ Harbor. A similar ferry service in the NY/NJ Harbor could:

- Benefit from the lesser tidal swings in the harbor compared to Boston, where there is a nine-foot swing (meaning that standard, less expensive barges could be used).
- Similarly address potential congestion resulting from the movement of materials for the major construction projects under consideration for the region, as well as address the limited amount of space available in Manhattan for construction staging areas.

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<sup>47</sup> Personal communication, Martin Toyen, Seaworthy Systems, Inc., 4/21/05; Captain Alan Bish, Reinhour Transportation, 5/5/05.

<sup>48</sup> Ibid.

Suggestions to reduce operating costs included allowing drivers to stay with their vehicles, having the drivers load and unload their own vehicles, and potentially considering a barge/ferry that could be loaded/off-loaded at both ends of the vessel. This dual end barge system would facilitate loading and unloading.

### ROCHESTER-TORONTO FERRY “THE BREEZE”

The Rochester-Toronto Ferry “The Breeze” was selected as a case study because it is an example of a recent ferry start-up that has the capacity for passengers and freight, providing insight into both ferry start-up and mixed passenger/freight issues.

#### Niche Markets Illustrated and Served

- Tourism
- Passengers
- Some freight potential, less than truck-load, time sensitive services (e.g. Kodak, Xerox headquartered in Rochester)

Figure 5. Rochester-Toronto Ferry



Source: City of Rochester, <http://www.ci.rochester.ny.us>

#### Overview of the Operation

This passenger and automobile fast ferry started up service in June 2004 and operated until September 2004, serving 80 days and 130,000 passengers.<sup>49</sup> The service ran between Rochester, New York (US) and Toronto, Ontario (Canada), across Lake Ontario. The alternative crossing to the 84 nautical mile, 2 hour 10 minute ferry trip across the lake is a 3 hour and 30 minute drive around the lake, with customs adding upwards of an hour or more, depending upon wait time at the border. The City of Rochester had pursued the initiation of a ferry service between Rochester and Toronto, Ontario with the intention that this service would be a catalyst for the local economy. The market is viewed as primarily tourists looking for an excursion, but the trip reduces travel time and is a faster transit link than by highway between two areas. This could be important as service grows for the estimated 10% of business travelers from Rochester.

The City of Rochester Business Plan notes that the demand for fast ferry service between Rochester and Toronto has been well documented in previous market studies: from 870,000 to 1.7 million passengers, and from 250,000 to a high of nearly 1 million cars. During the twelve weeks of operation, Canadian-American Transportation Systems (CATS) actually carried a total of 133,344 passengers and 21,239 cars. The Business plan notes the problems that occurred in the early weeks of operations and indicates that it is hard to annualize these numbers. With the slow start occupancy averaged only 33%; however, for the next six weeks, occupancy averaged 71%, and it reached as high as 90% in the last full week of August.<sup>50</sup>

The initial start-up ferry service was developed and operated by CATS, a private sector company. Due to unanticipated costs occasioned by repairs needed because of a pier crash during transit to Rochester from Australia, which also resulted in a delayed arrival; border-crossing issues; required coast guard pilotage and undercapitalization, the company stopped service after only 80 days of service. The Coasting Trade Act (CTA) is another potentially costly cabotage regulation that could apply to this service.<sup>51</sup>

<sup>49</sup> Interview with John Thomas, Transportation Specialist, City of Rochester, 4/19/05; 6/14/05; 7/8/05; 7/13/05. TransSystems Maritime Strategy International, “Ferry Business Plan Review” (Rochester: City of Rochester, 20 December 2004), p. 10.

<sup>50</sup> City of Rochester, Rochester Port and Ferry Authority (RPFA), “A Plan of Business” (Rochester, RPFA, November 2004), p. 13, [http://www.ci.rochester.ny.us/mayor/FastFerry/ferry\\_plan1.pdf](http://www.ci.rochester.ny.us/mayor/FastFerry/ferry_plan1.pdf), Accessed online 4/18/05.

<sup>51</sup> The CTA requires that any vessel operating in regular service between Canadian ports within the Great Lakes either be a Canadian flag vessel or pay a monthly Coasting Trade license fee, equal to 1/120<sup>th</sup> of 25% of the value of the vessel annually. If a Canadian flag vessel contests the license by proving they can provide the same service level, the license can be revoked. An alternative is to import a vessel into Canada and flag it Canadian. There would be a 25 percent duty plus the Canadian Goods and

While the private ferry operations stopped, the specially built vessel that had been given “certificates of operation” within the Great Lakes (therefore compliant with many of the numerous regulations regarding maritime activities between U.S. and Canada on the Great Lakes) was to be put up for auction. Under the lead of Mayor Johnson of the City of Rochester, the city successfully purchased the ferry at auction for \$32 million, and worked diligently to restart service which had been touted as the “hope” for the economy and the community, bringing excitement to the Port area, seen as an opportunity to bring the northeast economy out of the doldrums. To restart the ferry, the City of Rochester needed the authority to take on ferry operations and The Rochester Port and Ferry Authority was established as a public authority under New York State Law to operate a passenger and automobile ferry service on Lake Ontario. The Authority purchased the vessel that CATS used, and may still purchase other assets, both fixed and intangible. The Authority established a Board of Directors, and with city staff issued an RFP in 2004.

On Tuesday March 8, 2005 the Board of Managers of the Rochester Ferry Company authorized a three-year agreement with Bay Ferries Limited of Charlottetown, Prince Edward Island to operate fast ferry service between Rochester and Toronto. The agreement calls for Bay Ferries to be responsible for the full service operation of the vessel Spirit of Ontario 1 and all other aspects of the fast ferry service.<sup>52</sup> The new service, which began on June 27, 2005, is a for-profit operation.

For the initial ferry start-up, the City of Rochester contributed a 12 acre site in the Port area and with Border Crossing funds from TEA-21 of \$25 million, with a \$1 million match from the City, had constructed a new terminal on 1000 North River Street (Genesee River Harbor). It was an adaptive reuse of a 71,000 square foot 1930 warehouse, and is on an eleven-acre site which includes a vehicle queuing area (145 vehicles); a vehicle disembarking area (130 vehicles); primary and secondary customs inspection areas; and two parking lots (425 cars total). The facility includes a ticketing area; a public concourse and waiting area; airport-type passenger ramp; luggage carousel; with restaurants and other services. The site is also served by public transportation. The Authority leases the terminal from the City.

In Toronto, a new port terminal was constructed on Cherry Street (Pier 51/52) by the Toronto Port Authority. The facility includes ticketing area; departure and arrival halls; Canadian Customs offices; and retail and restaurant space.<sup>53</sup> This terminal was not constructed until after the first service failed because initially the City of Toronto had facilities that would serve for docking, and did not see the same need for new facilities at the inception of service. Also, Toronto was not as committed or inspired as Rochester.

Part of the due diligence undertaken by the City of Rochester during the interruption of service was to review and restate the “Plan for Business” and to conduct an independent review of to purchase the fast ferry previously operated by CATS. This review noted several issues that could adjust the previous revenue assumptions including recognizing that seasonal issues, Canada’s experience with the SARS epidemic which seriously reduced tourism travel in general to the area, as well as other crossing issues can affect levels of service. The new annual traffic demand was conservatively estimated at 385,705 passengers and 59,200 automobiles.<sup>54</sup>

Nevertheless, in January 2006, the Mayor of Rochester announced that he would not back the City Council’s request for a bond to keep the Fast Ferry operating noting that in its first year of operation, the Fast Ferry lost roughly \$10 million and was insolvent by November 2005. Indeed, the City already owes Bay Ferries \$2.5 million.<sup>55</sup>

**Rate Structure:** The Fast Ferry was operating at high speed, over 50+ MPH, accommodating approximately 750 walk-on passengers, up to 220 cars and up to 10 trucks and buses. Reports from John

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Services Tax (GST) applied to the vessel upon entry. It appears from TranSystems review that CATS had exempted themselves from the CTA by showing a business plan that only sold one-way tickets. (A round trip ticket from Toronto back to Toronto may be interpreted as operating in regular service between Canadian ports). If imposed, the CTA monthly licensing fee, including GST of 7 percent, would be \$89,167 on a vessel valued at \$40 million, or nearly \$1 million per year.

<sup>52</sup> City of Rochester, RPFA, “A Plan of Business.”

<sup>53</sup> Ibid.

<sup>49</sup> Ibid., p. 4.

<sup>55</sup> “City of Rochester, News Releases “Mayor Duffy Says “No” to Fast Ferry Bonding Request, Shuts Down Ferry Service,” <http://www.ci.rochester.ny.us/mayor/NewsReleases/index.cfm?release=1865> (accessed 6/26/06).



Thomas of the City of Rochester noted that the new start-up in June was showing between 200 and 400 people riding daily. The approximate two and a half hour "port to port" trip acted as a virtual bridge, connecting the national highway systems of Canada and the United States. While there was a rate structure for trucks, the primary service was passenger, and freight service was considered secondary.

The Business Plan forecasted "\$1.4 million in income from trucks and buses," noting that "to achieve this, 5,843 trucks or buses must be carried in year one."<sup>56</sup> The average truck/bus fare is estimated to be \$260 per crossing as compared to the CATS fare of \$275 (Table 7). CATS management reported good progress in resolving the issue of customs inspection and in gaining potential truck customers. Among the parties expressing interest in regular truck passage are the following: Labatt's; Wegmans; Kodak; and American Rock Salt." The TranSystems Ferry Business Plan Review noted that "truck and bus volumes may be increased by entering into contract deals with freight companies and coach lines. There may be a niche market for the Freight movement, even with only 4 day sailings in the winter."<sup>57</sup> Based upon the actual experience, it was expected that tour buses would be a significant market and would be aggressively marketed. Even so, with a level of only 10 trucks or buses per trip as compared to 600 passengers and 200 cars, this service remained primarily for passengers, and was thus exempt from the Harbor Maintenance Tax.

**Table 7. CAT Rochester-Toronto 2005 Rates and Reservations**

<b>Peak Sailings: 6/24 - 9/5/05 (other dates TBD--Yankees, etc)</b>		
One round trip voyage - four days /week (two crossings) between October 16 <sup>th</sup> and April 15 <sup>th</sup>		
Two round trip voyages – seven days/week (four crossings) during Peak season.		
Vessel will lay up from January 16 <sup>th</sup> through 31 <sup>st</sup> each year for annual dry/wet dock work.		
<b>Low Vehicles to 6'6"</b>	<b>Off-Peak One Way</b>	<b>Peak One Way</b>
Vehicle & Trailer up to 20'	\$30.00	\$35.00
Vehicle & Trailer 21' to 30'	\$45.00	\$50.00
Vehicle & Trailer 31' to 40'	\$60.00	\$65.00
Vehicle & Trailer 41' to 50'	\$100.00	\$105.00
Motorcycles	\$20.00	\$25.00
Motorcycle & Side Car	\$30.00	\$35.00
Motorcycle & Trailer	\$35.00	\$40.00
Bicycles	\$10.00	\$10.00
Bicycles & Trailer	\$15.00	\$15.00
<b>Medium Vehicles 6'7" - 8'4"</b>		
Vehicle & Trailer up to 20'	\$40.00	\$45.00
Vehicle & Trailer 21' to 30'	\$55.00	\$60.00
Vehicle & Trailer 31' to 40'	\$70.00	\$75.00
Vehicle & Trailer 41' to 50'	\$110.00	\$115.00
<b>High Vehicles 8'5" - 14'9"</b>		
Vehicle & Trailer up to 20'	\$180.00	\$185.00
Vehicle & Trailer 21' to 30'	\$195.00	\$200.00
Vehicle & Trailer 31' to 40'	\$210.00	\$215.00
Vehicle & Trailer 41' to 50'	\$250.00	\$255.00
*\$10 per foot surcharge for vehicles in excess of 50'		
*Return Vehicle Discount	\$15.00	
Port & Security Fee	\$5.00	
Total Fees per person	\$5.00	
<b>Port &amp; security fee applied to all passengers including bus and group passengers</b>		

Source: Bay Ferries, Great Lakes, <http://www.catfastferry.com/fares/>.

<sup>56</sup> City of Rochester, RPFA, "A Plan of Business."

<sup>57</sup> TranSystems Maritime Strategy International, "Ferry Business Plan Review: Final," (Rochester: City of Rochester, 20 December 2004), p. 12, [http://www.ci.rochester.ny.us/mayor/FastFerry/12\\_20\\_04\\_Fast\\_Ferry\\_Business\\_Plan\\_Review.pdf](http://www.ci.rochester.ny.us/mayor/FastFerry/12_20_04_Fast_Ferry_Business_Plan_Review.pdf), Accessed online, 4/18/05.

## **Issues and Considerations**

The failure of the initial start-up service pointed up several key issues. Foremost among the issues is the need for an experienced operator familiar with the maritime regulations and associated costs. For example, it is unclear if the decision to have the vessel under foreign flag was expedient, or made for some cost considerations. Whatever the reason, the result was costly to operations (two to three thousand dollars per day), and cumbersome given the need to pay for and have a coast guard pilot on board for each sailing.<sup>58</sup> Several other issues are better characterized as bad luck. For example the damage sustained by the vessel en route to Rochester which delayed initial start-up, added cost to repair and resulted in dollars spent on an advertising campaign which could not be repeated for actual start-up, reducing marketing reach to passengers.

A key aspect to ferry operations is that there are often two different jurisdictions involved. In this case not only two cities, but these cities are in two different countries. In the initial set-up, the City of Toronto did not share the excitement for the service, and in fact, did not commit to build a terminal or barge facility. The second time around, the City has built a terminal and is committed to the service which they see now as an opportunity to combat some negative tourism effects from the SARS scare. Getting the commitment from both terminal point land-owners/jurisdictions is an important component to ensure common expectations for ferry service.

## **Lessons Learned/Applicability to NY/NJ Harbor**

The City of Rochester was committed to the ferry service as an opportunity to combat the doldrums of the northeast economy. The “hope” put on the project and the excitement in the Port area provided a “buzz” that was invigorating to the community. When the private operator failed, it was a difficult road back, but this time around, due diligence has been given to the items that caused the first operation to fail. Since the successful bidder for the operations is an established Canadian company, and one that is experienced in ferry operations, the Toronto side of the ferry service is much more focused on supporting the service. With both terminal areas and countries backing the service, it is expected that the service will be a success.

Regarding the Harbor Maintenance Tax, there was a section in the Business Plan Review by TranSystems that covers the “primarily passenger only” (including their vehicles) exemption of HMT for ferries. The report reviews the court cases brought against the HMT, including the Detroit Truck Ferry. In that ruling it was determined that since the ferry marketed exclusively for cargo, not passengers, it was subject to HMT. TranSystems also notes that there have not been any documented cases for a combination (passenger and freight) ferry service. As the Rochester ferry was predominantly marketing to and servicing passengers, it was not subject to HMT. However, the writers of the TranSystems report did suggest that the City of Rochester seek a formal Customs Ruling based on the business and marketing plans.<sup>59</sup>

Representatives from Rochester have noted the following lessons for developing a ferry service in the NY/NJ Harbor:

- Engage an experienced ferry operator
- Identify start-up and associated costs with Coast Guard requirements, inspections
- Capitalize the service appropriately to cover incidents
- Make sure both governments (for the NY/NJ Harbor, two different states) that house terminals share the concept and support the service with the necessary terminal facilities

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<sup>58</sup> TransSystems, “Ferry Business Plan Review.”

<sup>59</sup> TransSystems, “Ferry Business Plan Review,” p. 4.

## GALVESTON-PORT BOLIVAR FERRY

The Galveston Island-Port Bolivar Ferry was selected as a case study because it is an example of a highway link for both passengers and freight. It was also chosen because it is one of the longest serving passenger/freight ferries (begun in 1929), reflects public policy commitment, and has undertaken analysis that considers and costs alternatives to ferry service.

### Niche Markets Illustrated and Served

- Highway Service
- All Traffic
- Ferry link as public policy commitment and economic choice over other infrastructure

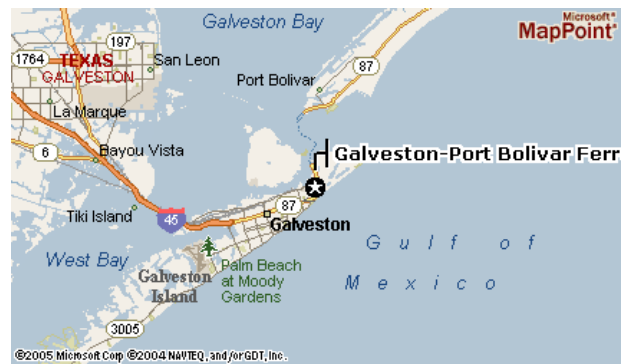
### Overview of the Operation

The Galveston-Port Bolivar ferry in Texas provides a link between two segments of State Route 87, located on either side of the Bolivar Roads Channel. South of Interstate 10, which runs through Houston, SR 87 is the only highway around Galveston Bay, and the ferry service provided for free by the Texas Department of Transportation (TxDOT) is the only means for vehicular traffic to cross the waterway between the Bolivar Peninsula and Galveston Island. The 2.7-mile trip ferry takes roughly 15 minutes, with an average load/unload time of 9 minutes, for a total of 24 minutes.<sup>60</sup> The alternative route via I-10 and Houston is 133 miles and takes approximately 3 – 3 ½ hours.<sup>61</sup>

According to the Texas Comptroller, while technically feasible, the alternative of building to connect Port Bolivar and Galveston is “prohibitively expensive.” The cost to build a four-lane bridge at Port Bolivar is estimated at \$83 million.<sup>62</sup>

Ferry service has a long history in this part of Texas and Port Bolivar was one of the first ports established in Texas. As early as 1896, barge service, operated by the Gulf and Interstate Railway, moved freight cars and passengers across Bolivar Roads Channel.<sup>63</sup> Unlike the current system, however, early ferry operations were commercial ventures and only made the trip when there were paying customers. Regularly scheduled service between Port Bolivar and Galveston Island was established by a privately owned company in 1929. In the same year the company sold its two ferries to Galveston County and the county operated the ferry service for about 6 months before it petitioned the state to take over the service because it was not self-supporting. The two vessels were sold to the State of Texas in April 1930, with the first service operated by the State starting on July 1, 1934. The early ferry operations were commercial ventures and only made the trip when they had paying customers. Texas operated the ferry service toll-free for approximately half a year, but the service was so popular that Galveston County officials asked the state to impose a 25 cent charge to reduce traffic congestion, which remained in place for fifteen years. However, in 1949, on the basis that the ferry provided the continuation of a highway link, and since

Figure 6. Galveston-Port Bolivar Ferry Route



<sup>60</sup> Texas Department of Transportation, “Ferry Operations,” <http://www.dot.state.tx.us/mnt/ferryops/ferryops.htm#history>, Accessed 3/29/05.

<sup>61</sup> Window on State Government, “The State Department of Highways and Public Transportation Should Charge a Toll for the Ferry Systems,” <http://www.window.state.tx.us/tpr/btm/btmtr/tr13.html>, Accessed online 3/28/2005. Note that in this report, costs for this 133-mile trip were estimated at \$5 for gasoline plus the motorist’s time. The assumptions regarding estimated costs are based on a car achieving 25 miles per gallon and gasoline prices of \$1.00 per gallon.

<sup>62</sup> Window on State Government, “The State Department of Highways and Public Transportation Should Charge a Toll for the Ferry Systems.”

<sup>63</sup> University of Texas at Austin, “Handbook of Texas Online: Port Bolivar, TX,” [www.tsha.utexas.edu/handbook/online/articles](http://www.tsha.utexas.edu/handbook/online/articles), Accessed online 3/29/2005.

roads are provided “free” by TxDOT, it was determined that the ferry service, operated by TxDOT should also be “free.”

The ferry operates 24 hours a day 7 days a week 365 days per year, and is the primary means for evacuation of residents from Bolivar Peninsula when hurricanes threaten. Peak months for use of the current service are June, July, and August. Truck traffic is primarily local delivery and represents about 10% of the total traffic.<sup>64</sup> The TxDOT ferry system carries more than 6 million people annually, and average daily traffic is 4,800 vehicles.<sup>65</sup> Hazardous materials are banned from the ferry, as are over-weight and over-dimensional vehicles.<sup>66</sup>

The TxDOT ferry operation consists of five diesel-powered vessels that can travel at 12 knots. Originally the vessels were 185 feet long and 55 feet wide; in 1977 all the vessels were lengthened to 245 feet and widened to 66 feet to increase the capacity to 70 vehicles, 500 passengers, and six crewmembers.<sup>67</sup> Each ferry is capable of carrying eight 18 wheel trucks weighing 80,000 pounds each. The vessels are double-ended with a pilothouse on each end, and the Captain changes from one pilothouse to the other to go in the opposite direction. Between 1994 and 1996, additional maintenance and mooring facilities were built and the public rest areas were completely rehabilitated. Secure, lighted parking facilities were also provided on both sides to serve walk-on passengers.

**Rate Structure:** Ferry service is free and ferry operations receive no federal funding. State funding is appropriated each biennium with sources of revenue derived from state sales, gas tax and cigarette taxes (there is no income tax in the state of Texas). Annual operations and maintenance, including fuel and labor (6 crew/vessel), for 2004-2005 for the Galveston-Port Bolivar ferry was \$9.5 million.

### Issues and Considerations

State statutes allow ferry operations to recover all or a portion of their costs by charging tolls. While the Galveston ferry did charge a fare early in its history (25 cents from 1932 until 1949), a review of this fare structure in 1968 by the then named State Department of Highways and Public Transportation (SDHPT) Commission determined that no tolls would be charged for the passage of any type of vehicle or passenger on the ferries. However, the issue of tolls has reemerged from time to time, most recently in the early 1990s when the Texas Transportation Institute (TTI) was engaged to evaluate the feasibility of imposing tolls on the ferries. While the recommendation was to implement a toll structure, and a toll facility considered purchase in the early 1990s, there has been no movement to change the free ferry service operating between Galveston and Port Bolivar.

In a preliminary version of the TTI study, a comparison of costs was presented, showing annual operating expenditures of \$6.4 million from the State Highway Fund in fiscal year 1990 for the Port Bolivar system. In comparison, the cost of building a 4-lane bridge would be \$83 million and the costs to maintain a bridge would be approximately \$210,000 for the first five years, after which maintenance costs would increase. While the recommendation was to implement a toll structure, and a toll facility considered purchase in the early 1990s, nothing has resulted to date.<sup>68</sup>

Currently, TxDOT is spending \$30 million in state funds to build the third berth to reduce queuing in peak periods. Its application for federal Ferry Boat Discretionary funds was unsuccessful. TxDOT is also developing rules to implement a “Priority Boarding” ticket which will be posted to the Texas Register and then undergo a period of public comment in some months. The call for the “priority boarding” is to ease

<sup>64</sup> Personal communication, Mike Alford, TxDOT, 7/19/05.

<sup>65</sup> Texas Department of Transportation, “Ferry Operations.”

<sup>66</sup> Texas Administrative Code, 24 TexReg 10145 § 29.49,

[http://info.sos.state.tx.us/pls/pub/readtac\\$ext.TacPage?sl=R&app=9&p\\_dir=&p\\_rloc=&p\\_tloc=&p\\_ploc=&pg=1&p\\_tac=&ti=43&pt=1&ch=29&rl=49](http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=43&pt=1&ch=29&rl=49), Accessed online 7/27/05.

<sup>67</sup> Crewmembers include Captain, Engineer, Oiler, 2 –AB’s, and 1 OS. See William P. Mallini, “Welcome to the Galveston Ferry Operation,” Presentation at the 26<sup>th</sup> Annual Summer Ports, Waterways, Freight & International Trade Conference, Galveston, Texas 6/24-27/01, <http://gulliver.trb.org/conferences/2001SummerPorts/Session6Mallini.pdf>, Accessed online, 3/29/05.

<sup>68</sup> Window on State Government, “The State Department of Highways and Public Transportation Should Charge a Toll for the Ferry Systems.”

congestion, and facilitate resident and regular commuter trips in peak summer seasons. The concept is for each sailing to be filled to 50% with priority ticket holders, and then fill with others in the queue. While the *Galveston County Daily News* recently reported an annual ticket price of \$30 to \$35, and a limit to residents within the Galveston zip code area, Mike Alford of the Houston Division of TxDOT suggests that the proposed ticket would be available to any registered vehicle owner.<sup>69</sup>

A last consideration related to this case study is the existence of public policy allowing redirected use of ferries. In effect since November 1999 (prior to September 11, 2001), Title 43, Subchapter C which covers the operation of state-owned ferries, Rule 29.44 outlines a policy position for the state regarding the classification of ferries. It reflects the operational flexibility inherent in a ferry operation and allows that in times of "...local, state, or national emergency, or at such other time as may be required to accommodate or facilitate department needs, the department may change the classification of one or more of its ferries from passenger vessel to cargo vessel to allow the carriage of a hazardous material that would not be permitted aboard a ferry classified as a passenger vessel."<sup>70</sup> This action would be taken in conjunction with the United States Coast Guard Marine Inspection Office.

### **Lessons Learned/Applicability to NY/NJ Harbor**

TxDOT operates the Galveston-Port Bolivar Ferry as an integral part of its state highway network. Several public policy positions are of interest to the NY/NJ harbor application. One is the clear connection to public policy in its fare policy over the years, which may be changing in the future to manage congestion and use of the ferry. Another policy perspective was addressed when Texas considered, priced and rejected the replacement of the ferry with a fixed facility. And finally, and perhaps most interesting is the pre-9/11 recognition of the utility and flexibility afforded by a non-fixed facility for other emergency public purposes, including those specifically relating to the carriage of hazardous materials.

### **SUMMARY**

The cases provided a number of specific lessons learned, including:

- Use existing equipment to keep costs low and utilize a RO/RO service.
- Have a scheduled and reservation service, with adequate frequency.
- Require advanced information on Hazmat and OW/OD vehicles.
- Engage an experienced ferry operator who will be familiar with start-up and associated costs as well as Coast Guard and other regulatory requirements.
- Capitalize the service appropriately to cover incidents.
- Make sure both governments (for the NY/NJ Harbor, two different states) that house terminals share the concept and support the service with the necessary terminal facilities.

All these lessons will help in implementing a successful ferry operation in the NY/NJ Harbor. However, the most important lessons learned through this exercise are broader and relate to how to generate the market for freight ferries in the first place. As Detroit-Windsor and Quincy-Deer Island demonstrate, public policy decisions will be critical to creating a market in a location where many alternatives currently exist. Further, the successes at Detroit-Windsor and Quincy-Deer Island, along with the initial failure in Rochester-Toronto, and the limitations of the Galveston-Port Bolivar operation, all point toward niche markets as an approach more likely to succeed.

The cases also highlighted several additional considerations related to developing freight ferry service in the NY/NJ Harbor, including funding, crewing, and regulatory issues, all of which are discussed in the following section.

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<sup>69</sup> *Galveston Daily News*, "Press Reports," (20 March 2005), [www.galvestondailynews.com/story.lass?tool=print&ewcd=cc3cb997da41c3b9](http://www.galvestondailynews.com/story.lass?tool=print&ewcd=cc3cb997da41c3b9), Accessed online 3/29/05; and Personal communication, Mike Alford.

<sup>70</sup> Texas Administrative Code, Title 43, Part 1, Chapter 29, Subchapter C Rule 29.44 24.

## 4. OTHER CONSIDERATIONS

Beyond the issues directly related to each of the potential niche markets, there are several additional external considerations that could affect the likelihood of success of a freight ferry operation across the NY/NJ Harbor. There are potential regulatory barriers such as the Harbor Maintenance Tax and Jones Act, labor and crewing concerns, cultural issues related to travel preferences, as well as environmental and other issues.

Some of these considerations may be dealt with relatively easily given the earlier recommendations of having a RO/RO operation and dedicated domestic terminals. In the case of a RO/RO operation, for example, dredging is not a concern since the necessary vessels have a lower draft and require shallow water access channels. Also, the landside investments required for such operations are relatively modest, requiring ramps and some yard tractors (as opposed to cranes and other machinery for container operations). Finally, landside locations are more flexible when dealing with only domestic cargo, since they need not be physically located near Customs, as is the case with the Detroit-Windsor Ferry. Indeed, precisely for these reasons, an earlier study looking at just this issues noted that "...a viable short-sea service in the United States should be based on so-called "exclusively" freight ferries, with the freight handled using the RO/RO system for regular road equipment."<sup>71</sup>

However, some of the issues are more complex and may require action beyond the region. The following paragraphs touch on several of these, explaining the concerns related to freight ferry operations and the degree to which they might impact a freight ferry operation in this region.

### REGULATORY ISSUES

Among the key obstacles often cited for short sea shipping more broadly, and for freight ferries specifically, are the Harbor Maintenance Tax and the Jones Act. The former, it is argued, discourages short sea shipping because it leads to a double tariff on containers that enter one U.S. port and then are shipped to another U.S. port. In the case of the latter, it is believed to raise the costs associated with building and buying the ships necessary to begin operations. However, as is shown in the following paragraphs, in the NY/NJ Harbor, neither is likely to play a significant role.

#### Harbor Maintenance Tax

Each year, eleven different federal agencies levy over 100 different assessments on the commercial maritime industry.<sup>72</sup> Included in these assessments are fees such as customs duties, ship registry fees, and inspection charges. While vessel owners and operators pay the majority of the individual assessments, the total value of the collection of these is significantly less than the amount collected from the few assessments levied on the shippers themselves.<sup>73</sup>

In FY01, approximately \$1 billion was collected from the assessments on vessel owners and operators, roughly 85% of which was credited to one of two trust funds: the Harbor Maintenance Trust Fund and the

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<sup>71</sup> NPWI, *The Public Benefits of the Short-Sea Intermodal System*, p. 3.

<sup>72</sup> Animal, Plant & Health Inspection Service and Grain Inspection, Packers & Stockyard Administration at the Department of Agriculture; Centers for Disease Control and Prevention at the Department of Health & Human Services; Coast Guard and Maritime Administration at the Department of Transportation; Customs Service and the Internal Revenue Service at the Department of Treasury; National Oceanic & Atmospheric Administration at the Department of Commerce; the Federal Communications Commission; Department of Justice; and the Federal Maritime Commission. U.S. General Accounting Office (USGAO), *Marine Transportation: Federal Financing and a Framework for Infrastructure Investments*. Report to the Chairman, Subcommittee on Surface Transportation & Merchant Marine, Committee on Commerce, Science & Transportation, U.S. Senate, GAO-02-1033 (September 2002), p. 11.

<sup>73</sup> USGAO, *Commercial Maritime Industry: Updated Information on Federal Assessments*, Statement of John H. Anderson, Jr., Director, Transportation Issues, Resources, Community & Environmental Development Division, Testimony before the Subcommittee on Water Resources & Environment, Committee on Transportation & Infrastructure, House of Representatives, GAOIT-RCED-00-36 (3 November 1999), p. 1; and USGAO, *Commercial Maritime Industry: Updated Information on Federal Assessments*, Report to the Chairman & Ranking Democratic Member, Committee on Transportation & Infrastructure, House of Representatives, GAO-RCED-99-260 (September 1999), p. 8.

Inland Waterways Trust Fund. Additionally, the Customs Service collected an estimated \$15.6 billion from duties on commodities entering the United States, a little over two-thirds of which were directed into the General Fund.<sup>74</sup>

Among these duties and assessments is the Harbor Maintenance Tax (HMT), an *ad valorem* tax assessed on the value of shipments of commercial cargo through the nation's ports. The HMT has been pointed to as "the single biggest issue that hampers short sea shipping, both domestically and internationally."<sup>75</sup>

**History:** The Harbor Maintenance Tax was introduced by the Reagan Administration as part of the Water Resources Development Act of 1986 as a means to have users of maritime services pay for the upkeep and dredging of channels and harbors. Originally set at 0.04% of assessed cargo, the HMT rose to 0.125% on January 1, 1991. The increase led to the filing of numerous lawsuits with the U.S. Court of International Trade, challenging the constitutionality of the HMT on exports. The Court selected the United States Shoe Corporation (US Shoe) as the nominal plaintiff in a case against the United States.<sup>76</sup> The case was appealed to the Supreme Court which ruled for the plaintiff.

The Supreme Court held that the HMT, as it applied to exports, violated the export clause of the Constitution (Art. I, 9, cl 5) which states, "No Tax or Duty shall be laid on Articles exported from any State." While the export clause prohibits Congress from imposing any tax or duty on exports, the clause does not prohibit Congress from enacting a "user fee," as the counsel argued on behalf of the United States. The Court found that the HMT was indeed a tax and not a user fee as it was determined entirely on an *ad valorem* basis, which did not correlate with the federal harbor services that the exporter consumed.<sup>77</sup> In 2000, the federal government refunded \$37 million to exporters who paid the tax during the judgment period.<sup>78</sup>

In order to preserve the tax on exporters, the Clinton administration proposed to replace the Harbor Maintenance Tax with a Harbor Services User Fee. Because this tax would be assessed on commercial vessel operators based on type, capacity, movement, and operational characteristics of the vessel, the administration believed this would correspond significantly with the services the vessels consumed by using the port. The House Committee on Transportation and Infrastructure, Subcommittee Committee on Water Resources and Environment held a hearing on the bill on November 3, 1999, but no further action was taken.<sup>79</sup>

The HMT no longer applies to exports, but continues to persist and continues to be the source of much contention. U.S. trade partners object to it since they believe they are paying for the United States to attend to its own ports, not to mention the double tax if their goods are moved by water beyond the initial port of entry. Similarly, not all ports view the HMT as fair since not all ports need dredging; they argue that if it must remain, then the needs to which it can be applied should be expanded so all ports can make use of the revenues. Finally, many have questioned the significant accumulation of funds in the Harbor Maintenance Trust Fund (estimated at \$2.5 billion at the end of FY2004), wondering if it is being used by the Federal government to show a balanced budget.<sup>80</sup>

**Effect on Freight Ferries and Impact in the NY/NJ Harbor:** For ferry operations that cross borders, such as those in Detroit-Windsor and potentially Rochester-Toronto, as well as for coastal short sea shipping, the HMT is indeed a hindrance. If a truck or train can move the materials free of this charge,

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<sup>74</sup> USGAO, *Marine Transportation*, pp. 12-13.

<sup>75</sup> Pamela Glass, "NAFTA Members Far Apart on Short Sea," *News Log* 3, 62 (1 March 2005): 24, Lexis Nexis Practice Area Community, Retrieved 6/1/05.

<sup>76</sup> Charles H. Critchlow, "Harbor Maintenance Tax Unconstitutional," FindLaw.com, [http://library.lp.findlaw.com/articles/file/00324/000651/title/Subject/topic/Civil%20Remedies\\_Interest/filename/civilremedies\\_2\\_1252](http://library.lp.findlaw.com/articles/file/00324/000651/title/Subject/topic/Civil%20Remedies_Interest/filename/civilremedies_2_1252), Accessed on 01/19/05.

<sup>77</sup> United States, Petitioner v. United States Shoe Corporation. No. 97 U.S. 372 (1998).

<sup>78</sup> United States Army Corps of Engineers, "Annual Report to Congress: Status of the Harbor Maintenance Trust Fund Fiscal Years 2000, 2001 and 2002," <http://www.iwr.usace.army.mil/iwr/pdf/hmtfreport00-02.pdf>, pg. 3, Assessed 01/21/05.

<sup>79</sup> *Ibid*, p. 5.

<sup>80</sup> Vivien Schlesinger, "Harbor Maintenance Tax Lives," *Journal of Commerce* 4, 2 (13 January 2003): 100, Business Source Premier, Retrieved 5/17/05.

why would a shipper choose to utilize a ferry instead, particularly when it often leads to a double tax on the goods being moved?

Recognizing this, several states, including Massachusetts and North Carolina, have developed incentives that mitigate the effect of the HMT. Massachusetts offers shippers a dollar-for-dollar state tax credit for companies that pay the HMT when docking at Massachusetts ports. The tax credit began in 1996 to stop shippers from bypassing the port of Boston to dock directly in Montreal, where they would pay additional trucking costs to route cargo back into the United States, rather than paying the HMT.<sup>81</sup> In its first full year after its inception, containerized cargo tonnage at the Port of Boston rose 12.4%. Total tonnage increased 6.79% in the same year.<sup>82</sup> North Carolina takes a different approach, offering corporate income tax breaks based on the additional cargo that moves through the state's ports from one year to the next.<sup>83</sup>

However, in the case of a domestic freight ferry crossing the NY/NJ Harbor, such incentives are unlikely to be necessary, nor is the HMT likely to pose an impediment to developing a successful operation. According to 26 USC §4462(g), "Under regulations, no tax shall be imposed under section 4461(a) on the mere movement of cargo within a port."<sup>84</sup> 19 CFR §24.24 describes the ports in the United States. The description for New York Harbor, NY, NJ is as follows:

Includes all points in New York and New Jersey with the Port of New York on the waters inshore of a line between Sandy Hook and Rockaway Point and south of Tappan Zee Bridge on the Hudson and west of Throgs Neck Bridge on the East River. *Movements between these and all points within the New York Port District boundaries described in New York Code (Chapter 154, Laws of New York, 1921) are intraport.* [emphasis added].<sup>85</sup>

Nevertheless, prior to establishing a freight ferry service, this exemption should be formally recorded. Of final note, during the 108<sup>th</sup> Congress, Representative Philip English (R-PA) introduced legislation that would further reduce the impact of the HMT on other types of border ferry operations as well. Introduced on March 3, 2004, HR3883[108] is aimed at adding an exemption to the Internal Revenue Code for "certain truck cargo on a ferry operating between two ports for the sole purpose of bypassing traffic congestion on the nearest international bridge serving the area in which such ports are located." The bill was referred to the House Committee on Ways and Means where no further action was taken by the end of the 108<sup>th</sup> Congress.<sup>86</sup>

More recently, on July 18, 2005, Representative Dave Weldon (R-FL) and Christopher Shays (D-CT), introduced the Short Sea Shipping Tax Exemption Act of 2005 [HR 3319]. The Act would exempt from the HMT "cargo contained in intermodal cargo containers and loaded by crane on a vessel or cargo loaded on a vessel by means of wheeled technology in a port in the United States mainland for transportation to another port in the United States mainland solely by coastal route or river (or combination thereof)" as well as the unloading of such material.<sup>87</sup> In effect, the Act would exempt from the HMT all coastwise shipping, including coastwise container, ferry, or RO/RO traffic moving between U.S. mainland ports.

## Jones Act

A second regulatory concern often pointed to with respect to freight ferry operations is the Jones Act, formally the Merchant Marine Act of 1920. Like the HMT, the Jones Act has been a source of contention

<sup>81</sup> Brendan J. Dugan, "Tax Credit Gives Boost to Boston," Inboundlogistics.com, <http://www.inboundlogistics.com/articles/viewpoint/viewpoint1098.shtml>, Accessed 01/21/05.

<sup>82</sup> Ibid.

<sup>83</sup> Peter T. Leach, "Big Question: How to Create a Network?," *Journal of Commerce* (Apr. 16, 2004): 1.

<sup>84</sup> 26 USC §4461(a) stipulates that there is a tax imposed on any port use.

<sup>85</sup> 19 CFR §24.24, p. 367.

<sup>86</sup> U.S. House of Representatives, HR 3882[108], "To Amend the Internal Revenue Code of 1986 to Exempt from the Harbor Maintenance Tax Certain Truck Cargo on a Ferry Operating Between Two Ports for the Sole Purpose of Bypassing Traffic Congestion on the Nearest International Bridge Serving the Area in which Such Ports are Located," <http://www.govtrack.us/congress/billtext.xpd?bill=h108-3882>, Accessed online 5/17/05.

<sup>87</sup> U.S. House of Representatives, HR 3319, "Short Sea Shipping Tax Exemption Act of 2005," <http://thomas.loc.gov/cgi-bin/query/query>, Accessed online 8/1/05.



and various activities to have it repealed or at least modified. In essence, the Jones Act stipulates that all vessels operating between U.S. ports must be domestically built, owned, operated, and crewed.

***Effect on Freight Ferries and Impact in the NY/NJ Harbor:*** Because U.S. shipyards have a higher cost structure than many others around the globe, the Jones Act automatically increases the costs involved in purchasing new vessels. The federal government views the Jones Act as a protective measure for the U.S. merchant fleet as well as a security measure and is unlikely to modify the Act in the near future. However, occasional waivers are allowed and it is possible that a waiver could be granted to reduce start-up costs for a new freight ferry system.

Even without a waiver, it is unlikely that the Jones Act on its own would sufficiently hamper development of a freight ferry operation in the NY/NJ Harbor. According to NPWI, the vessel costs entailed in beginning a short sea shipping operation can be broken down into three categories: capital recovery costs, operating costs (crewing, maintenance, insurance, and administration), and voyage costs (fuel and port handling fees).<sup>88</sup> While the Jones Act certainly raises capital recovery costs, the largest share of costs for short sea shipping are associated with operating costs. Furthermore, in some cases, there may be existing vessels (such as barges and tugs) that could be utilized for service in the NY/NJ region.

## CREWING

As noted above, the largest portion of the costs for short sea shipping is related to operations, and according to NPWI, the largest share of these costs results from labor costs.<sup>89</sup> These in turn are directly related to crew size. Thus, it is helpful to at least outline some of the issues and costs related to crewing.

Mandates, regulations, and guidelines related to numbers of licensed crewmembers on vessels vary by type and size of vessel as well as whether there are passengers being carried on board or not. Vessels that transport hazardous materials have additional requirements.<sup>90</sup> No statutes exist mandating specific numbers of unlicensed crewmembers. However, because the United States is party to the International Convention on Standards of Training, Certification, and Watch-keeping for Seafarers (STCW), there are requirements with respect to minimum qualification and certifications of such crewmembers.<sup>91</sup>

While some vessel classes have specific regulatory requirements and statutes for minimum crewing levels, in many cases there are no specific regulations but a series of guidance instead. When specific mandates and regulations do not exist, determining the correct level of crewing is the responsibility of the Officer in Charge, Marine Inspection (OCMI).<sup>92</sup>

In addition to statutory and regulatory requirements, the OCMI is guided to consider several factors when establishing the “safe manning level” for vessels. Among them are: size of the vessel, the route being taken and any special hazards peculiar to that route or service, the distance traveled, hull and equipment maintenance needs, type and horsepower of propulsion machinery, maintenance of machinery and equipment, the degree of automation of deck and engine room equipment, the type of cargo being transported, the cargo transfer system, fire protection systems, the level of qualification of each crew position to perform tasks demanded by the vessel’s mission, the number of passengers carried if any, the hours of operation, and the successful operation of similar vessels.<sup>93</sup>

For freight ferries, there are no current mandates/guidelines for crewing of freight ferries, since few exist at this time. In the available literature, when discussing crewing for such vessels, estimates are made based on guidelines for other types of vessels. A recent report on short-sea shipping by the National

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<sup>88</sup> NPWI, *High Speed Ferry and Coastwise Vessels: Assessment of a New York/Boston Service*, p. 6.

<sup>89</sup> NPWI, *The Public Benefits of the Short-Sea Intermodal System*, p. 6.

<sup>90</sup> According to 46 USC §8703, “Tankermen are required aboard all vessels that carry oil or hazardous materials in bulk as cargo or residue.”

<sup>91</sup> USDOT, U.S. Coast Guard, *Marine Safety Manual: Volume 3 – Marine Industry Personnel*, COMDTINST M16000.8B (May 27, 1989), p. 23-1.

<sup>92</sup> *Ibid.*, p. 20-2.

<sup>93</sup> *Ibid.*, p. 20-2. Of note, according to 46 USC §8301, “An offshore supply vessel on a voyage of less than 600 miles shall have a licensed mate. However, if the vessel is on a voyage of at least 600 miles, the vessel shall have 2 licensed mates.”

Ports and Waterways Institute estimated that for a route of 190 miles between Boston and New York City, three licensed crewmembers and two unlicensed crewmembers would be needed for continuous operation, including nights and weekends.<sup>94</sup> However, the route across the Harbor would be substantially shorter.

Sample crewing sizes for different types of vessels and different types of locations are provided in the U.S. Coast Guard *Marine Safety Manual*. For general operations in lakes, bays, and sounds, involving mechanically-propelled cargo/tank vessels of 100 and more gross tons (GT), the following sample crew is given:

Needed:	1 master/1 <sup>st</sup> class pilot; 1 <sup>st</sup> class pilot; 1 chief engineer
Variable:	4 able seamen; 2 ordinary seamen; certificated lifeboatmen; 1 1 <sup>st</sup> assistant engineer; 2 firemen/watertenders; 2 oilers; 2 tankermen <sup>95</sup>

Perhaps a better estimate is provided by looking to the crewing on the Detroit-Windsor Ferry, which carries truck drivers inside their cabs. Currently, for a 12-hour operation, utilizing a tug-barge ferry, the Detroit-Windsor operations are crewed with one captain, one engineer, and one deckhand per vessel. For a 24-hour operation, at least one additional complement would be needed, perhaps two depending upon shifts and time off. If more than one vessel is needed, particularly if more than one niche market is pursued at a time, then additional crews would be needed as well.

To give a broad sense of cost, it is helpful to look at a few statistics. NPWI offers some base salaries for licensed and unlicensed crewmembers, with \$90,000/year for licensed and \$60,000/year for unlicensed.<sup>96</sup> However, the Bureau of Labor Statistics offers the following annual salaries: \$60,770 for the captain; \$61,260 for the engineer; and \$36,990 for the deckhand.<sup>97</sup> If one assumes that the real cost is somewhere between these estimates and assumes at least one vessel operating 24 hours with two full crews, the annual salary cost would be between \$318,040 and \$480,000 plus benefits.

### **Work Hour Limits for Crews and Hours of Service for Truckers**

Unlike trucking, in most cases there are no mandated work hour limits for individuals working on marine vessels. Various parts of 46 USC §8104 do limit the number of hours that licensed individuals and/or crewmembers can be *required* to work on certain classes of vessels. However, in most cases this does not preclude these individuals from *voluntarily* working beyond those limits.<sup>98</sup> Maximum work hour limits do exist, however, for licensed individuals and seamen on tankers.<sup>99</sup>

Whether the new hours of service imposed on trucking might aid in generating a market for ferries is questionable. Under the new regulations which became effective on June 27, 2003 (compliance date was January 4, 2004), driving hours have been extended from 10 hours to 11 hours. However, the maximum daily hours have been reduced from 15 hours to 14, and more importantly, the way they are calculated is now changed. Previously, the clock stopped when breaks were taken, effectively extending the 15-hour period; now the clock runs continuously, so breaks cannot extend the maximum daily hours worked. The hours of rest required have been increased from 8 to 10 cumulative hours.<sup>100</sup>

The trip across the harbor may be too short to be of consequence for truckers with respect to rest periods. However, it is worth noting that should a coastal short-sea shipping operation be established that could link to this service, there might be added incentive for truckers to utilize the ferry service, particularly if a special exception were promulgated to allow truckers to be “off the clock” while their vehicles were turned off and on a barge.

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<sup>94</sup> See for example NPWI, *The Public Benefits of the Short-Sea Intermodal System*, p. 7.

<sup>95</sup> U.S. Coast Guard, *Marine Safety Manual*, p. 21-12.

<sup>96</sup> NPWI, *The Public Benefits of the Short-Sea Intermodal System*, p. 7.

<sup>97</sup> U.S. Bureau of Labor Statistics, “May 2004 National Occupational Employment and Wage Estimates: Transportation & Materials Moving Occupations,” [http://www.bls.gov/oes/current/oes\\_53tr.htm](http://www.bls.gov/oes/current/oes_53tr.htm), Accessed online 8/4/05.

<sup>98</sup> *Ibid.*, p. 20-10.

<sup>99</sup> 46 USC §8104(n).

<sup>100</sup> U.S. National Archives and Records Administration, Office of the Federal Register, *Federal Register* 68, 81 (April 28, 2003), pp. 22456-22517, <http://www.fmcsa.dot.gov/documents/rulesregs/hos/hos-reg.pdf>, Accessed online 7/5/05.

## FUNDING

Funding can be thought of in terms of three stages of a freight ferry operation:

- Initial capital investment and construction;
- Initial start-up of the operation; and,
- Continual operation of the ferry.

Funding sources and methods will likely vary by stage. For example, public sector funding may be needed to foster initial investments and for a limited start-up period of operations. It is assumed that if the private sector operates the ferry, then that entity would be responsible operation costs. The exception would be operation of a construction-related barge for a major public sector project or limited public sector support for ongoing operations or improvements.

The primary federal funding source that could be drawn upon for development of a freight ferry operation in the NY/NJ Harbor is the Federal Ship Financing Program. There are additional programs, including the Ferry Boat Discretionary Program and the Congestion Mitigation and Air Quality Improvement Program (CMAQ), as well as several others that could be drawn upon depending upon the niche market that the new service fills and the location of the terminals and routes. Additionally, direct funding by public agencies and/or private sector entities could be used.

Under Title XI of the Merchant Marine Act of 1936, the Federal Ship Financing Program provides long-term financing (up to 25 years) with “attractive” terms for eligible commercial vessels and shipyards that want to enhance their shipbuilding technology. With respect to vessels, the Act guarantees 87.5% financing for several types of vessels, including “ferries engaged solely in point-to-point transportation, not less than 75 gross tons and capable of sustained speed of not less than 8 knots.”<sup>101</sup> Covered costs include construction, reconstruction, reconditioning, designing, inspection, outfitting, and equipping of the vessel. Several fees are required, including a \$5,000 non-refundable filing fee as well as an investigation fee of 0.5% on obligations to be issued up to and including \$10 million. Above that figure, an additional 0.125% investigation fee is levied.<sup>102</sup>

Created under Section 1062 of the Intermodal Surface Transportation Equity Act of 1991 (ISTEA), and reauthorized under the 1998 Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21), the Ferry Boat Discretionary Fund (FBDF) provides funding for the construction of ferry vessels and terminals. While the competitive funding under this program is only open to passenger-only service, there is a \$5 million set aside for New Jersey (Washington and Alaska also have set asides of \$5 million and \$10 million, respectively) with slightly different requirements to be met.

Among the requirements for eligibility in New Jersey are the following:

- The ferry and/or ferry terminal to be constructed or improved is either publicly owned, publicly operated, or a public authority has majority ownership interest where it is demonstrated that the ferry operation provides substantial public benefits.
- The ferry does not operate in international water except for Hawaii, Puerto Rico, Alaska, and for ferries between a State and Canada.
- For a ferry facility that provides a direct link on the NHS [National Highway System], both the ferry boat (must transport four wheel vehicles) and the ferry terminals, including approaches, are eligible for funding.
- For a ferry facility that lies at the end of an approved connector to the NHS, only the ferry terminal (can serve either vehicle or passengers) and approach is eligible for funding.<sup>103</sup>

<sup>101</sup> USDOT, MARAD, “Title XI Program,” [http://www.marad.dot.gov/TitleXI/title\\_xi\\_program.html](http://www.marad.dot.gov/TitleXI/title_xi_program.html), Accessed online 7/14/05.

<sup>102</sup> Ibid.

<sup>103</sup> USDOT, FHWA, “Ferry Boat Discretionary Program Information,” <http://www.fhwa.dot.gov/discretionary/fbdinfo.htm>, Accessed 2/16/05.

Thus, depending upon whether a new freight ferry service is public, the route taken and the roads being connected on either side of the Harbor, it could be eligible for funding under this program, but this is unlikely to be the case given the niche markets being discussed in this report.

CMAQ, which was also enacted by ISTEA and reauthorized under TEA-21, is another source of potential funding and is more flexible in its allowances of private-public entities. The key eligibility requirement under CMAQ is demonstration of an air quality benefit. Monies may be used to support operations for up to three years. Additionally, projects must be located “within, or in close proximity to, the nonattainment or maintenance area.”<sup>104</sup> The region has successfully competed for CMAQ funds related to waterborne freight movement in the past. The Red Hook Container Barge in New York was awarded \$1.9 million in CMAQ funding to purchase a barge and provide operating assistance. It required a 50:50 match. Also, \$3.3 million was awarded under CMAQ for the first two years of operation of the Port Inland Distribution Network (PIDN) Albany ExpressBarge.<sup>105</sup>

Beyond these, there are additional sources dependent upon the niche market served. For example, the Detroit-Windsor Truck Ferry was awarded a grant under the Port Security Grant Program, overseen by the U.S. Department of Homeland Security, Office for Domestic Preparedness. The grant was provided to design and implement an advanced notification and tracking system for trucks transportation Hazmat on the ferry.

## **OTHER ISSUES**

There are a number of other issues that need to be addressed with a freight ferry operation, though the impact of each of them may be somewhat different depending upon which niche market is being served. Among these issues are environmental concerns, safety/security issues, funding and the need for better information and coordination.

### **Environmental Concerns**

Basic environmental concerns related to freight ferries (and ferries in general) are aimed at location of terminal construction and operations. As noted in Section 2, location is of more import in the case of the air cargo niche market as a result of the bird sanctuary located near JFK. For other niche markets, there are more choices for routes and landings and location is likely to be less an issue than some other environmental concerns.

With respect to operations, concerns revolve around wakes and wake-induced erosion, particularly for high-speed ferries, as well as on air and water pollution that the vessels themselves may generate. While wakes can cause environmental disruptions, even high-speed ferries can be designed in a way to minimize this. In terms of pollution, ferry diesel engine emissions are not currently regulated and are a source of NO<sub>x</sub> and particulates. However, cleaner technologies are available and a number of ferry systems around the country have already been implementing them.<sup>106</sup>

Of greater concern to some is the environmental impact that could be caused by an accident or spill, particularly if the Hazmat niche market is pursued, but there are techniques that could be employed to help prevent and/or mitigate such incidents.

### **Safety/Security/Emergency Response**

A ferry offers the possibility of enhanced security and safety. First and foremost, as noted earlier, a ferry provides increased redundancy for the overall regional transportation network and is less susceptible to

<sup>104</sup> USDOT, FHWA, Environment, “Memorandum: Information – Eligibility of Freight Projects and Diesel Engine Retrofit Programs,” <http://www.fhwa.dot.gov/environment/cmaqpgs/retrom.htm>, Accessed 7/14/05.

<sup>105</sup> USDOT, FHWA, Environment, “Memorandum: Information – Eligibility of Freight Projects and Diesel Engine Retrofit Programs. Also see NY/NJ Harbor Estuary Program, Dredged Material Management Integration Working Group (DMMIWG), “Minutes,” (5 February 2003), p. 4, <http://www.seagrant.sunysb.edu/hep/minutes/dmmiwg-03feb5.pdf>, Accessed online 7/14/05.

<sup>106</sup> See, for example, Washington State Department of Transportation, Washington State Ferries, “WSF Clean Fuel Initiatives,” <http://www.wsdot.wa.gov/ferries/environment/fuel/>, Accessed 7/14/05.

sabotage since it requires less fixed infrastructure. Second, a ferry also offers more flexibility in times of crisis since it can easily change routes and landing sites if necessary, and purposes can be quickly changed as is recognized by the Galveston-Port Bolivar Ferry case. Finally, for specific niche markets, if all Hazmat and/or OW/OD vehicles were required to utilize a ferry, enforcement and inspections could be easily streamlined and made more effective.

### **Travel Preferences**

The issue of the “one-seat ride” is heard repeatedly within the transit community and among transit advocates. The argument is that passengers prefer the most simple, hassle free route; thus even when faced with the possibility of a transfer to a potentially faster train for a portion of their ride, they are likely to remain on the slower service if it has proven reliable and, especially, if they already have a seat.

Though the process guiding passenger and freight decisions are somewhat different (an individual can make his/her own decision at the last moment, but a truck driver may have a specified route and his/her pick up and delivery times are generally determined by the shipper or receiver) there are some similarities worth noting. Reliability is critical for freight movements. Faced with a new and unproven ferry service, shippers may be reluctant to utilize the service. While there may be delays at the tunnels and bridges, shippers and truckers are already accustomed to them, but the delay duration at a new ferry service may be perceived as too unpredictable during the initial start-up phase.

A second travel preference issue stems from the need to utilize more than one mode when using a freight ferry service. Unloading cargo in New Jersey to load it on a ferry, only to load it again in New York may appear inefficient, though this could be remedied with an RO/RO operation. More importantly, if a truck is driving through several states to get to New York or New Jersey, or just crossing through them to yet another point, it does not make sense to put cargo on a ferry for a small portion of the trip unless there are significant time and/or cost savings as well as essential assurances of reliability associated with such a move.

## 5. CONCLUSIONS, RECOMMENDATIONS and NEXT STEPS

Freight ferries offer an alternative to current fixed modes of travel for freight movement across the NY/NJ Harbor. Depending upon the niche market pursued, how the service is operated, and where the landings are located, a freight ferry could provide increased redundancy, increased efficiency, mitigation of community disruptions, and reduced congestion in the region.

### CONCLUSIONS

Based on the team's analysis, three central conclusions emerged:

1. Public policy interventions of some type (e.g., rules banning Hazmat over regional tunnels and bridges, freight-focused time-of-day or value pricing regulations, or limitations on truck access via local streets to construction sites) are likely to be needed to create and shape freight ferry markets in this region.
2. Examining niche markets provides a viable starting point for a potential bi-state freight ferry development as demonstrated by the niche market successes found in other regions.
3. Increased redundancy, new emergency services alternatives, and increased service efficiency are potential regional benefits that may be derived from freight ferry system development.

### Public Policy Intervention Will Be Needed to Create and Shape the Market(s)

The New York-New Jersey Region's roadway system, while increasingly congested, remains robust, with almost 80% of freight in the region traveling by truck. In the current market, a freight ferry would not provide the time and/or cost savings necessary to attract general freight movement, especially given the preference for single line truck service. Given the option between using the roadway network or ferries, trucking firms are likely to continue to select the roadway network. Without coordinated public policy intervention, it is unlikely that a ferry market for trucks will readily develop on its own.

With such public leadership, a successful bi-state freight ferry operation could be implemented as has been done in at least two other cases: Detroit-Windsor and Quincy-Deer Island. In the former, a publicly-owned, privately-operated tunnel and a privately-owned and operated bridge both made formal corporate decisions to refuse to allow transport of a particular set of goods (hazardous material or Hazmat), thus providing that the service needs around which the Detroit-Windsor Truck Ferry built its initial operations. The Ferry has since attracted over-weight and over-dimensional vehicles as well as some general truck traffic to its service mix. In the latter case, a public authority in conjunction with the local town, made the decision that all materials and personnel needed to build the Deer Island sewage treatment facility would be barged rather than driven on local streets into the construction site.

### Niche Markets Are the Best Means for Ensuring Success

In addition to policy decisions, niche markets are and were the basis of the successful Detroit-Windsor and Deer Island Ferry operations. The team identified and assessed four potential niche markets in the New York metropolitan region:

1. Hazardous materials
2. Over-weight and over-dimensional vehicles
3. Construction materials and equipment
4. Air cargo movements to/from JFK

After reviewing these markets, the team determined that the first three appear to be viable possibilities. Based on the experience of the Detroit-Windsor Ferry, the movement of hazardous materials and over-weight/over-dimensional vehicles can be facilitated through the policy and administrative decisions to foster those markets. Construction materials/equipment movements comprise a third market that offers the opportunity to remove potentially significant numbers of truck movements from congested streets and

neighborhoods such as built up sections of Manhattan, and allow staging areas to be placed in less disruptive locations. Thus this ferry option may provide a means for ameliorating the impacts of construction and debris removal on surrounding communities. A domestic freight ferry based on the air cargo market faces serious hurdles given the geography of the harbor and the location of the wildlife refuge. Thus, additional study would be needed to address these complexities and challenges before a recommendation could be made for proceeding in this area.

Coordinated public policy intervention is essential to initiating the first three markets. In the case of Hazmat and OW/OD vehicles transportation, the agencies responsible for bridge and tunnel operations (e.g., Port Authority, MTA, NYCDOT) would need to coordinate their efforts and essentially ban or heavily toll these movements through their facilities, with the assurance that a freight ferry would be available to provide the required back up service. For construction materials and equipment, a freight ferry offers the opportunity to remove potentially significant numbers of truck movements from congested areas, such as built-up sections of Manhattan, and allows staging areas to be placed in less congested locations. Similar to Deer Island, the freight ferry option also provides a means for ameliorating the impacts of construction on surrounding communities. As with Deer Island, for this niche market to be effectively pursued, the public agencies overseeing these projects would need to decide that truck ferry options would be practicable. Again in this region, given the complexity and size of the many projects being considered, multiple agencies would need to coordinate and cooperate in their efforts.

### **Enhanced Security and Emergency Service Response Could Be Added Benefits**

A freight ferry could provide enhanced security in several key ways. It is less susceptible to sabotage, since it requires less fixed infrastructure, and it offers more flexibility in times of crisis – for example, freight ferries can transport passengers, and routes and landing sites can be changed with relative ease. Regardless of which niche market is being serviced, a freight ferry provides increased redundancy for the overall regional transportation network.

By concentrating all Hazmat on ferries, agencies could gain tighter control of these shipments throughout the region. In the case of OW/OD vehicles, as well as vehicles transporting Hazmat, enforcement (especially spot checks) would be made simpler and more effective, since all such vehicles would be utilizing the same crossing.

## **RECOMMENDATIONS AND NEXT STEPS**

The team recommends additional follow up regarding the policies and business decisions that would be needed to foster three of the niche markets – Hazmat, OW/OD, and construction materials/equipment – which may eventually accommodate more general freight traffic wherever possible. Additionally, the team recommends that the Hazmat and OW/OD niche markets be pursued jointly, while the construction materials/equipment move forward as a parallel effort.

Based on the cases and the research into freight ferries more broadly, the team identified several components of successful freight ferries as well as several steps needed to pursue successful operations in this region.

First, leadership is important, particularly in a region with multiple jurisdictional authorities. While the Port Authority of New York & New Jersey is uniquely placed to provide such leadership, there are several other entities with which it would need to coordinate to develop and implement the administrative and policy decisions necessary to generate a viable niche market for freight ferries in the New York/New Jersey metropolitan region. The other entities include the Metropolitan Transportation Authority (MTA), Lower Manhattan Development Corporation, NJ Transit, New York City Department of Transportation, New York State Department of Transportation, and (in the case of Hazmat) the City of New York Fire Department.

Second, this report identifies potential markets based on what has worked elsewhere and what could work in this region. However, more technically specific analyses would be needed for each of the

potential niche markets identified. While the research for this report identified RO/RO as the simplest and least costly approach, the following still need to be addressed in the technical analyses:

- identification of terminal/staging area locations;
- environmental impacts;
- specific security and safety considerations;
- hours of operation;
- vessel/barge types;
- travel times;
- crewing levels;
- ferry fee structures (or other specific funding plans); and,
- roadway fine structures, where applicable.

Third, having an experienced operator familiar with maritime operations and associated costs is essential. Due diligence will be needed to refine the parameters, costs and aspects of each niche market service, and ensure that all regulations are taken into account during decision making.

Finally, the team identified a series of federal considerations, ranging from the applicability of the Harbor Maintenance Tax (HMT) to crewing requirements that need to be formally addressed prior to the commencement of any service. These rules and regulations can potentially adversely affect operating costs. Among the issues are the following:

- HMT: Though the HMT is not an issue in the Harbor, because the wording of the regulation is open to interpretation (and misinterpretation), this will need to be formally clarified as actual routes and landing/staging areas are identified.
- Jones Act: While there are likely vessels already built that could be used, thus reducing the Jones Act's impact on initial capital costs, other regulations regarding the percentage of the crew who are citizens versus those with working permits will need to be taken into account.
- Crewing: The number of crewmembers needed will have to be estimated since there are few freight ferries in the United States and there are no specific guidelines as yet. The discussion in the preceding pages modeled costs on potential crewing numbers, but these will need to be formally discussed based on Coast Guard regulations and examples of other cases (notably, Detroit Windsor if a Hazmat niche is pursued).

In cases where rules and regulations are unclear in their applicability, it would be important to reach formal determinations and agreements with the appropriate federal agencies prior to implementing ferry service.

Freight ferries have been proven to work in certain situations and markets. These potential benefits could accrue to this region. However, without effective leadership, coordination on key policy decisions and sufficient enforcement by agencies in New York and New Jersey, moving the freight ferry option forward will likely prove difficult if not impossible.



## 5. REFERENCES

- Bay Ferries. "Schedules and Fares." <http://www.nfl-bay.com/english/fast/schedule.html>. Accessed online 6/25/05.
- Byres, Ron, Mark Johnson and Daniel Hartford. "Modernizing the Galveston-Bolivar Ferry System." Paper presented at ASCE Ports 2004 Conference.
- Cambridge Systematics, Inc. Hunts Point Waterborne Freight Assessment: Opportunities to Meet the Community's Freight Transportation Needs through Waterborne Strategies, Draft Final Report. Prepared for NYMTC. August 18, 2004.
- \_\_\_\_\_. NYMTC Regional Freight Plan: Task 2 – Description of Freight Transportation System in the Region, Final Technical Memorandum. Prepared for NYMTC. July 2001.
- Cave, Damien. "Contract Truckers Feed the Ports, for as Little as \$40 a Load." *The New York Times*, 02 December 2004.
- Chapman, Parke. "Office Glut at Ground Zero." *National Real Estate Investor* 47, 1 (January 2005). <http://proquest.umi.com/pgdweb?did=780177511&sid=11&Fmt=4&clientId=9269&RQT=309&VName=PQD>. ProQuest, Retrieved 5/17/05.
- City of Rochester. Rochester Port and Ferry Authority (RPFA). "A Plan of Business." Rochester: RPFA, November 2004. [http://www.ci.rochester.ny.us/mayor/FastFerry/ferry\\_plan1.pdf](http://www.ci.rochester.ny.us/mayor/FastFerry/ferry_plan1.pdf). Accessed online 4/18/05.
- \_\_\_\_\_. "Rochester to Toronto Fast Ferry." <http://www.ci.rochester.ny.us/index.cfm?id=680>. Accessed online 4/05.
- Corbett, Stephen. "Boston Harbor Project: Water Transportation Systems Support a Major Urban Construction Project." In *Transportation Research Record No. 1608 – Ferry Transportation Planning and Operations*, 47-50. Washington, DC: Transportation Research Board, 1997.
- Cross Harbor Freight Movement Project. "Frequently Asked Questions." <http://www.crossharborstudy.com/faq.htm#r>. Accessed online 4/28/05.
- Denton, Jake. "A Lifesaver for Transportation? In Short-Sea Shipping, Freight Now Moved on Land Would Travel on Water." *Inside Business – the Hampton Roads Business Journal* (23 August 2004). <http://www.insidebiz.com/output.cfm?ID=3202026>. Accessed online 6/1/05.
- Detroit-Windsor Truck Ferry. "Hazmat." <http://www.truckferry.com/hazmat.html>. Accessed online 3/24/05.
- DMJM+Harris. "Traffic Statistics/Projections." Presentation for the Port Authority of NY & NJ. Provided by the PANYNJ.
- Durr, Eric. "Haulers at Odd on Over-weight-Truck Permit Bill." *The Business Review*, 13 June 2003. <http://albany.bizjournals.com/albany/stories/2003/06/16/story3.html?t=printable>. Accessed online 4/28/05.
- Edmonson, R.G. "Short-Sea Vs. HMT." *Journal of Commerce* (25 April 2005). Lexis Nexis Academic Universe. Retrieved 5/17/05.
- \_\_\_\_\_. "Targeting the HMT." *Traffic World* 268, 46 (15 November 2004): 55-56. Business Source Premier. Retrieved 5/17/05.

- \_\_\_\_\_. "Tax Break Sought for Short-Sea." *The Journal of Commerce Online* (20 July 2005). Lexis Nexis. Retrieved 7/25/05.
- Edwards and Kelcey Engineers. Cross Harbor Freight Movement Major Investment Study. Prepared for New York City Economic Development Corporation (May 2000): ES-1. <http://www.crossharborstudy.com/finalrep.pdf>. Accessed online 4/28/05.
- Glass, Pamela. "NAFTA Members Far Apart on Short Sea." *News Log* 3, 62 (1 March 2005): 24. Lexis Nexis Practice Area Community. Retrieved 6/1/05.
- Herzlich, Jamie. "New Call for NY Harbor Rail Tunnel." *Newsday*, 4 June 2003, A44.
- Hong Kong Trade Council. "New Cargo Facilities Open at JFK International Airport." [http://www.tdctrade.com/shippers/vol26\\_5/vol26\\_5\\_airfr04.htm](http://www.tdctrade.com/shippers/vol26_5/vol26_5_airfr04.htm). Accessed online 4/28/05.
- Lombardo, Gary. "Short Sea Shipping: Practices, Opportunities and Challenges." *Transportgistics White Paper Series* (24 May 2004). [http://www.insourceaudit.com/WhitePapers/Short\\_Sea\\_Shipping.asp](http://www.insourceaudit.com/WhitePapers/Short_Sea_Shipping.asp). Accessed online 6/1/05.
- Mallini, William P. "Welcome to the Galveston Ferry Operation." Presentation at the 26<sup>th</sup> Annual Summer Ports, Waterways, Freight & International Trade Conference, Galveston, Texas 6/24-27/01. <http://gulliver.trb.org/conferences/2001SummerPorts/Session6Mallini.pdf>. Accessed online, 3/29/05.
- Massachusetts Water Resources Authority. *Ferries and Barges no Longer Needed to Fuel Boston Harbor Project*. Press Release. 15 January 2001.
- Metropolitan Transportation Authority. "East Side Access MTA Long Island Rail Road Grand Central Connection: Project Schedule." <http://www.mta.nyc.ny.us/capconstr/esas/schedule.html>. Accessed online 4/21/05.
- \_\_\_\_\_. "Industry Briefing." (May 2004). [http://www.mta.nyc.ny.us/capconstr/sas/pdf/industry\\_briefing.pdf](http://www.mta.nyc.ny.us/capconstr/sas/pdf/industry_briefing.pdf). Accessed online 4/21/05.
- \_\_\_\_\_. "MTA Capital Construction – Fulton Street Transit Center." <http://www.mta.nyc.ny.us/capconstr/fstc/>, Accessed online 5/3/05.
- \_\_\_\_\_. "MTA Capital Construction – Fulton Street Transit Center: Project Schedule," <http://www.mta.nyc.ny.us/capconstr/fstc/schedule.htm>, Accessed online 5/3/05.
- \_\_\_\_\_. "Proposed Capital Program." September 2004. [http://www.mta.nyc.ny.us/capconstr/sas/pdf/industry\\_briefing.pdf](http://www.mta.nyc.ny.us/capconstr/sas/pdf/industry_briefing.pdf). Accessed online 4/21/05.
- \_\_\_\_\_. "2005-2009 Proposed Capital Program." September 2004. [http://www.mta.info/mta/budget/pdf/capitalprogram\\_proposed.pdf](http://www.mta.info/mta/budget/pdf/capitalprogram_proposed.pdf). Accessed online 4/21/05.
- \_\_\_\_\_ and the City of New York City Planning Commission. Final Generic Environmental Impact Study. June 2004. [http://nyc.gov/html/dcp/pdf/hyards/hy\\_chap23\\_t\\_fgeis\\_final.pdf](http://nyc.gov/html/dcp/pdf/hyards/hy_chap23_t_fgeis_final.pdf). Accessed online 4/21/05.
- Michigan Department of Transportation. "Bridge Tolls." [http://www.michigan.gov/mdot/0,1607,7-151-9618\\_11010---,00.html](http://www.michigan.gov/mdot/0,1607,7-151-9618_11010---,00.html). Accessed online 8/1/05.
- \_\_\_\_\_. "Placarded Vehicles." [http://www.michigan.gov/mdot/0,1607,7-151-9618\\_11032\\_29850---,00.html](http://www.michigan.gov/mdot/0,1607,7-151-9618_11032_29850---,00.html). Accessed online 8/1/05.

National Ports and Waterways Institute, University of New Orleans. *High Speed Ferries and Coastwise Vessels: Evaluation of Parameters and Markets for Application*. Prepared for the Center for the Commercial Deployment of Transportation Technologies. New Orleans: Louisiana State University, June 2000.

\_\_\_\_\_. *High Speed Ferry and Coastwise Vessels: Assessment of a New York/Boston Service*. Prepared for Center for the Commercial Development of Transportation Technologies. New Orleans: NPWI, May 2003.

\_\_\_\_\_. *The Public Benefits of the Short-Sea Intermodal System*. Prepared for the Short Sea Cooperative Program. New Orleans: University of New Orleans, November 2004.

New Jersey Turnpike Authority. "Regulations Relating to the Control of Traffic on the New Jersey Turnpike." <http://www.state.nj.us/turnpike/tpreg.pdf>. Accessed online 2/3/05.

New York City Department of Transportation. "Vehicle Permits for Commercial Use." <http://www.nyc.gov/html/dot/html/permits/commperm.html>. Accessed online 2/3/05.

New York City Economic Development Corporation (NYCEDC). Cross Harbor Freight Movement Project – Draft Environmental Impact Statement, and Appendix 2B: Commodity Flow Analysis. Produced in cooperation with U.S. Department of Transportation, Federal Highway Administration and Federal Rail Administration. NY: NYCEDC, April 2004.

New York Metropolitan Transportation Council and South Western Regional Planning Agency. "Long Island Sound Waterborne Transportation Plan and Hunts Point Ferry Assessment." Presentation to the Hunts Point Steering Committee. March 25, 2004.

New York State Department of Transportation. "Legal Dimensions, Weights, & Gross Weights for New York State." [http://www.dot.state.ny.us/nypermits/files/div\\_load/perm71.pdf](http://www.dot.state.ny.us/nypermits/files/div_load/perm71.pdf). Accessed online 2/3/05.

NY/NJ Harbor Estuary Program. Dredged Material Management Integration Working Group (DMMIWG). "Minutes." 5 February 2003. <http://www.seagrantsunysb.edu/hep/minutes/dmmiwg-03feb5.pdf>. Accessed online 7/14/05.

O'Brien, Elizabeth. "Silverstein Wants \$3.5B for WTC Site: Seeks All Remaining Liberty Bond Funds." *Bond Buyer* 352, 32117 (April 22, 2005). <http://proquest.umi.com/pqdweb?did=828861621&sid=10&Fmt=3&clientId=9269&RQT=309&VName=PQD>. ProQuest, Retrieved 5/17/05.

Paixão, A.C., and P.B. Marlow. "Strengths and Weaknesses of Short Sea Shipping." *Marine Policy* 26 (2002): 167-178.

Parsons/SYSTRON Engineering, Inc. *Lower Manhattan Airport and Commuter Access Alternatives Analysis: Final Report – Task 7*. NY: Lower Manhattan Development Corporation, 2004. <http://www.renewnyc.com/content/pdfs/LMRailLink.pdf>. Accessed online 7/5/05.

Pipeline and Hazardous Materials Administration. "Exemptions and Approvals," <http://hazmat.dot.gov/exempapp/approvals/exsys.htm>. Accessed online 4/29/05.

Port Authority of NY & NJ. Hazardous Materials: Transportation Regulations at Tunnel and Bridge Facilities. NY: PANYNJ, August 2004. [http://www.panynj.gov/tbt/pdf/red\\_book\\_2004.pdf](http://www.panynj.gov/tbt/pdf/red_book_2004.pdf). Accessed online 4/29/05.

\_\_\_\_\_. Traffic Rules and Regulations. NY: PANYNJ, June 2004. [http://www.panynj.gov/tbt/pdf/green\\_book\\_2004.pdf](http://www.panynj.gov/tbt/pdf/green_book_2004.pdf). Accessed online 2/3/05.

- Quinn, T.J. "Bronx Beep Goes to Bat for Stadium." *New York Daily News* (April 22, 2005). <http://www.nydailynews.com/sports/story/302491p-258973c.html>. Accessed online 5/17/05.
- Schlesinger, Vivian. "Harbor Maintenance Tax Lives." *Journal of Commerce* 4, 2 (13 January 2003): 97-102. Business Service Premier. Retrieved 5/17/05.
- Shafran, Issac, and Anne Strauss-Weider. NCHRP Report 497: Financing and Improving Land Side Access to U.S. Intermodal Cargo Hubs. Washington, DC: TRB, 2003.
- TAMS Consultants, Inc. *Assessment of the Market Demand for New Jersey Ferry Services: Final Report*. Prepared for the New Jersey Department of Transportation. January 2000.
- Texas Administrative Code. Title 43 – Transportation. November 21, 1999. 24 TexReg 10145 § 29.49. [http://info.sos.state.tx.us/pls/pub/readtac\\$ext.TacPage?sl=R&app=9&p\\_dir=&p\\_rloc=&p\\_tloc=&p\\_ploc=&pg=1&p\\_tac=&ti=43&pt=1&ch=29&rl=49](http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=43&pt=1&ch=29&rl=49), Accessed online 7/27/05.
- Texas Department of Transportation. "Ferry Operations." <http://www.dot.state.tx.us/mnt/ferryops/ferryops.htm#history>. Accessed 3/29/05.
- TransTech Marine. "Analysis of Potential Freight Ferry Alternatives to the Proposed Cross Harbor Freight Tunnel." Prepared for North Jersey Transportation Planning Authority, Inc. September 2004. [http://njtpa.org/planning/freight/documents\\_freight/CH\\_FrFerry\\_AttchB.pdf](http://njtpa.org/planning/freight/documents_freight/CH_FrFerry_AttchB.pdf). Accessed online 6/24/05.
- TranSystems Maritime Strategy International. "Ferry Business Plan Review: Final." Rochester: City of Rochester, 20 December 2004. [http://www.ci.rochester.ny.us/mayor/FastFerry/12\\_20\\_04\\_Fast\\_Ferry\\_Business\\_Plan\\_Review.pdf](http://www.ci.rochester.ny.us/mayor/FastFerry/12_20_04_Fast_Ferry_Business_Plan_Review.pdf). Accessed online, 4/18/05.
- United States Bureau of Labor Statistics (BLS). "May 2004 National Occupational Employment and Wage Estimates: Transportation & Materials Moving Occupations." [http://www.bls.gov/oes/current/oes\\_53tr.htm](http://www.bls.gov/oes/current/oes_53tr.htm). Accessed online 8/4/05
- United States Department of Transportation (USDOT). Federal Highway Administration. *Comprehensive Truck Size and Weight Study: Summary Report*. August 2000. <http://www.fhwa.dot.gov/reports/tswstudy/Vol1-Summary.pdf>.
- \_\_\_\_\_. "Ferry Boat Discretionary Program Information." <http://www.fhwa.dot.gov/discretionary/fbdinfo.htm>. Accessed 2/16/05.
- USDOT. FHWA. Environment. "Memorandum: Information – Eligibility of Freight Projects and Diesel Engine Retrofit Programs." <http://www.fhwa.dot.gov/environment/cmaqpgs/retrom.htm>. Accessed 7/14/05.
- USDOT. FHWA. Freight Management and Operations. "Commercial Vehicle Size and Weight Program." FHWA-OP-03-099. May 2003. <http://www.ops.fhwa.dot.gov/freight/sw/overview/index.htm>. Accessed online 2/3/05.
- USDOT. Federal Motor Carrier Safety Administration (FMCSA). Office of Hazardous Materials Safety. "Hazardous Materials Regulations and Interpretations: Hazmat Table." <http://www.myregs.com/dotrspa/>. Accessed online 7/15/05.
- \_\_\_\_\_. "Hazardous Materials Safety Permits." <http://www.fmcsa.dot.gov/safety-security/hazmat/hm-permitting.htm>. Accessed online 4/29/05.

USDOT. Federal Transit Administration and MTA. Second Avenue Subway: Final Environmental Impact Statement. April 2004. <http://www.mta.nyc.ny.us/capconstr/sas/feis/pdf/chapter03.pdf>. Accessed online 4/21/05.

USDOT. Maritime Administration. "Short Sea Shipping." <http://marad.dot.gov/Programs/sssbroc.htm>. Accessed online 6/28/05.

\_\_\_\_\_. "Title XI Program." [http://www.marad.dot.gov/TitleXI/title\\_xi\\_program.html](http://www.marad.dot.gov/TitleXI/title_xi_program.html). Accessed online 7/14/05.

USDOT. Pipeline and Hazardous Materials Safety Administration. Office of Hazardous Materials and Safety. "Hazmat Regulations and Interpretation: Hazmat Table." <http://www.myregs.com/dotrspa/>. Accessed online 6/30/05.

USDOT. U.S. Coast Guard. Marine Safety Manual: Volume 3 – Marine Industry Personnel. Ch. 20-26. COMDTINST M16000.8B. May 27, 1989.

United States General Accounting Office. *Commercial Maritime Industry: Updated Information on Federal Assessments*. Report to the Chairman & Ranking Democratic Member. Committee on Transportation and Infrastructure. House of Representatives. GAO-RCED-99-260. Washington, DC: USGAO, September 1999.

\_\_\_\_\_. *Commercial Maritime Industry: Updated Information on Federal Assessments*. Statement of John H. Anderson, Director, Transportation Issues, Resources, Community and Economic Development Division. Testimony before the Subcommittee on Water Resources and Environment. Committee on Transportation and Infrastructure. House of Representatives. GAOIT-RCED-00-36. Washington, DC: USGAO, November 3, 1999.

\_\_\_\_\_. *Marine Transportation: Federal Financing and a Framework for Infrastructure Investments*. Report to the Chairman, Subcommittee on Surface Transportation & Merchant Marine. Committee on Commerce, Science & Transportation. U.S. Senate. GAO-02-1033. Washington, DC: USGAO, September 2002.

United States House of Representatives. HR 3319[109]. "Short Sea Shipping Tax Exemption Act of 2005." <http://thomas.loc.gov/cgi-bin/query/query>. Accessed online 8/1/05.

\_\_\_\_\_. HR 3882[108] "To Amend the Internal Revenue Code of 1986 to Exempt from the Harbor Maintenance Tax Certain Truck Cargo on a Ferry Operating Between Two Ports for the Sole Purpose of Bypassing Traffic Congestion on the Nearest International Bridge Serving the Area in which Such Ports are Located." <http://www.govtrack.us/congress/billtext.xpd?bill=h108-3882>. Accessed online 5/17/05.

\_\_\_\_\_. *United States Code*. Title 46 – Shipping. Washington, DC: Office of the Law Revision Counsel, 2001. <http://frwebgate5.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=246700309021+0+0+0&WALSaction=retrieve>. Accessed online multiple dates in June and July 2005.

United States National Archives and Records Administration. *Code of Federal Regulations*. Title 19 – Customs Duties. Washington, DC: USGPO, April 2003. <http://squid.law.cornell.edu/cgi-bin/get-cfr.cgi?TITLE=19&PART=24&SECTION=24&TYPE=TEXT>. Accessed 7/7/05.

\_\_\_\_\_. *Code of Federal Regulations*. Title 26 – Internal Revenue Code. Washington, DC: USGPO, 2003. [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=browse\\_usc&docid=Cite:+26USC4462](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=browse_usc&docid=Cite:+26USC4462). Accessed online 7/7/05.

\_\_\_\_\_. *Code of Federal Regulations*. Title 49 – Transportation. Washington, DC: USGPO, 2004. <http://www.gpoaccess.gov/cfr/index.html>. Accessed online multiple dates in June and July 2005.

- \_\_\_\_\_. Office of the Federal Register. *Federal Register* 68, 81. April 28, 2003.  
<http://www.fmcsa.dot.gov/documents/rulesregs/hos/hos-reg.pdf>. Accessed online 7/5/05.
- University of Texas at Austin. "Handbook of Texas Online: Port Bolivar, TX."  
[www.tsha.utexas.edu/handbook/online/articles](http://www.tsha.utexas.edu/handbook/online/articles). Accessed online 3/29/2005.
- URS Corporation. John F. Kennedy International Airport Air Cargo Truck Movement Study. Prepared for the PANYNJ. NY: URS, May 2002.
- Ward, John T. and Gregg M. Ward. "Excuse Me for Barging In: Establishment of a Hazardous Materials Ferry Between Detroit and Windsor." *Transportation Research Record* 1607, Paper No. 970759. (Washington, DC: TRB, 1997): 77-83.
- Washington State Department of Transportation. Washington State Ferries. "WSF Clean Fuel Initiatives."  
<http://www.wsdot.wa.gov/ferries/environment/fuel/>. Accessed 7/14/05
- Weisbrod, Roberta E. "Freight Ferries in New York/New Jersey Harbor: How to Make Them Happen."  
<http://www.thepoint.org/reenvisioning/freightferries.pdf>. Accessed online 7/5/05.